The impact of petroleum exporting countries' membership of the world trade organisation on their economic development with an emphasis on the export dependency of these nations on crude oil

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Abbreviation

AAETOV – Aggregate Average Export Trade Off Value

AAFTI – Aggregate Average Freedom to Trade Internationally

API – American Petroleum Institution

ASP – Average Spot Price

ATR – Average Tariff Rate

BP – British Petroleum

CER – Crude oil Export Ratio

CERL – Crude oil Export Ratio Line

EFW – Economic Freedom of the World

EIA – Energy Information Administration

ETO – Export Trade Off

ETOV – Export Trade Off Value

FDI – Foreign Direct Investment

FTI – Freedom to Trade Internationally

GATT – General Agreement in the Tariff and Trade

GTE – Growth of Total Export

IMF – International Monetary Fund

ISI – Import Substitution Industrialisation

LDCs – Less Developed Countries

MAACER – Mixed Aggregate Average Crude oil Export Ratio

MACER – Mixed Average Crude oil Export Ratio

NICs – Newly Industrialised Countries

NOEC – Number of Other Exportable Commodities

OECD – Organisation for Economic Co-Operation and Development

OLS – Ordinary Least Squares

OPEC – Organisation of Petroleum Exporting Countries

PI – Price Index

Abbreviation

RCA – Revealed Comparative Advantage

RSCA – Revealed Symmetric Comparative Advantage

SAACER – Simple Aggregate Average Crude oil Export Ratio

SACER – Simple Average Crude oil Export Ratio

SAP – Structural Adjustment Programme

SITC – Standard International Trade Classification

sXC – Supposed Crude Oil Exports

sXO – Supposed Non-Crude Oil Exports

TBD – Thousands Barrels Daily

TE – Total Exports

TFP – Total Factor Productivity

TPs – Time Periods

UNCTAD – United Nations Conference on Trade and Development

UTEL – Uniform Total Export Line

WDI – World Development Indicator

WTO – World Trade Organisation

XC – Crude Oil Exports

XO – Non-Crude Oil Exports

Special Symbols

np – Non-primary Product
p – Primary Product
$\mathcal{P}ri$ – Crude Oil Price
$\mathcal{P}ro$ – Crude Oil Production
θ – The change in the exports of primary product
λ – The change in the exports of non- primary product

Synopsis

In the mid-1990s, most nations, including some major oil exporting countries, joined the World Trade Organisation (WTO) to create a global trading system that was more integrated than ever before. The basic motive behind membership of this organisation was economic growth and industrialisation based on international trade. The theoretical underpinnings which support the idea can be found in the literature review,[1] yet despite these considerable efforts, the trade-development or industrialisation relationship still remains quite ambiguous.

In this research we study industrialisation in selected oil exporting nations after they became members of the WTO based on a two-phase analysis approach. In the first stage, we investigate the change in crude oil share in the total annual exports of these nations as

[1] For more information see chapter 2

the crude oil export ratio (CER) which has been very high, and in the second phase we study export portfolio diversification as an industrialisation index. In fact, the considerable share of crude petroleum in the export portfolio of these countries persuades us to ask whether or not they have successfully changed their comparative advantage from primary to manufactured goods after WTO membership to maximise their benefits from international trade.

To examine the change in the industrialisation level in oil exporting countries in two different time periods before and after membership of the WTO, we utilise the crude oil export ratio (CER) for the first phase and a variant of the Balassa revealed comparative advantage (RCA) measure for the second. The CER, tells us to what extent these nations have reduced (or may have increased) their economic dependency on crude petroleum exports after their membership of the WTO. Indeed, a high rate of such a dependency would not only create a more risky export portfolio in international trade but also could be considered as an important characteristic of underdeveloped or even non-industrialised economies. In simple terms, a meaningful shift in the comparative advantage from primary to complex commodities' production could be revealed in the shape of export diversification in these nations. This shift may enable these nations to be industrialised mostly when such activities are accompanied by a meaningful decrease in the CER as a consequence of WTO-led trade liberalisation. Although it is difficult to change the export specialisation pattern in a nation, it initially could be affected by technology absorption, especially when the level of education and institutions created for the purpose of absorbing *internationally diffused knowledge* are high in a nation.[2] Therefore, the key

[2] Dalum, Laursen and Villumsen (1996)

contribution of this study is to measure the impact of WTO membership using a new – and a much more comprehensive – method for the very first time.

This research consists of seven chapters. The first chapter provides a brief explanation of the goals and objectives of the present study. This chapter also includes the methods which will be utilised to investigate the research questions. The history of trade-development and industrialisation studies is discussed in the second chapter – as the literature review – to provide the background for the present research. Chapter three focuses on the methodology and its basic foundations to clarify the way which we investigate the research questions. In the fourth chapter we discuss the essential data and also the related data sources which have been utilised to analyse the economic dependency of the countries in the research population on crude petroleum exports. Chapter Five provides the results of CER analyses which indicate what really happened to economic dependency on crude oil in petroleum exporting nations after their membership of the WTO. Initial and terminal revealed symmetric comparative advantage (RSCA) has been analysed systematically based on a Galtonian regression in the sixth chapter to compare the distribution of the RSCA for each nation at two points before and after WTO membership. Finally, with regard to the results of the analyses, the research presents some recommendations in the last chapter.

Chapter 1

Research Structure

Introduction

This chapter provides a brief explanation of the goals and objectives of the present study and also provides the methods which will be utilised to investigate the research questions. It consists of seven sections. The history of trade liberalisation, the role of the WTO in governing international trade and also general information about oil exporting countries has been studied in the first section. The second part of the chapter focuses on the research goals and objectives. Section three provides some basic reasons for doing the research. Part four indicates questions which will be discussed in both the first and the second phase of the research. The method of the study is discussed in section five. In the sixth part of the chapter research limitations are briefly explained. Finally, in the last section we demonstrate what conclusions we have reached in the chapter.

1.1 WTO membership[3] and Crude oil dependent Economies

The World Trade Organisation (WTO) was established in 1995 out of the General Agreement on Tariffs and Trade (GATT) to stimulate international trade and investment through trade liberalisation, creating a set of rules and regulations to encourage its member-states to reduce or eliminate trade barriers. While most economists today would probably agree that "the best international trade policy for the world as a whole is free trade",[4] protectionism[5] has retained a powerful influence which can obstruct trade and investment within the global economic system. In the history of economic thought, protectionism has a long tradition which can be traced back to mercantilism; this doctrine suggested that a nation should strive to export more than it imports in order to accumulate a surplus and become wealthy. According to this doctrine, the role of government is to stimulate the nation's exports and restrict its imports, a view which retains some appeal among policy-makers today, as notably demonstrated by the export-led industrialisation policies of South-East Asian nations in the late 20th century.

In contrast, free trade doctrine can be traced back to the *Comparative Advantage Model* introduced by David Ricardo in 1817 which suggests that a nation should specialise in producing and exporting those commodities in which it has a comparative, or relative, cost advantage compared with other nations, and should import those products in which it has a comparative disadvantage. Based on this view, in the absence of any government intervention in international trade activities, resources are utilised in the most efficient

[3] Whenever we are talking about WTO membership in this research, we consider this expression as a complete package including trade freedom, anti-discrimination, anti-sanction and other rules' effects.

[4] For more information see Salvatore (2001)

[5] According to Moffat (1976) protectionism refers to "the feeling that government should protect domestic sellers from competition with imported goods and services by the use of taxes, quotas, prohibition, and other means."

way and the output of products will rise and the gains from specialisation in production will be divided between the nations through trade.[6]

Espousing the free trade theories of David Ricardo and his intellectual successors, the WTO's rules and regulations intend to facilitate free trade through the reduction of tariff barriers and other types of trade and investment discrimination, encouraging all nations to support trade liberalisation in order to maximise the aggregate welfare benefits of an international division of labour. While the multilateral agreements' provisions relating to trade in goods comprise some important issues such as tariffs, quotas (the main non-tariff barrier), anti-dumping, countervailing duties, subsidies, safeguards, and technical barriers to trade, other basic provisions deal with issues such as trade in services and trade-related intellectual property rights.

Given the scope and coverage of the WTO's rules and provisions, WTO membership necessitates far-reaching policy reforms by current and future member-states in the developing world, where government intervention in the economy tends to be substantial and where instruments such as intellectual property rights remain underdeveloped. Therefore, the political support for such policy reforms in developing nations depends on demonstrating net benefits from free trade for their international trade position and their long-term economic development. To put it differently, the present research will investigate to what extent WTO-led trade liberalisation affects the industrialisation level by supporting the export diversification process in developing nations. This research question is the driving force behind this study.

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[6] On the history of economic thought, see for example: *An Outline of the History of Economic Thought* by Screpanti, and Zamagni, (1993), an excellent book covering the early history of economic thought remains Gide, and Rist, (1915), *A History of Economic Doctrines – From the Time of the Physiocrats to the Present Day*.

The views on the relationship between free trade and economic development are divided in the developing world. On the one hand, some policy-makers in developing nations believe that free trade and compliance with all WTO rules has few net economic benefits (such as more innovations or a more highly skilled labour force) for their countries – not only in the short-run but also in the long-run. Indeed, the comparative advantage theory suggests that developing nations should produce and export primary goods such as raw materials, fuels or agricultural products (in which they specialise) to developed nations; this could prevent them from developing higher value-added activities (Krugman & Obstfeld, *1994;* Dunn & Mutti, *2000;* Salvatore, *2001*). On the other hand, economists such as Haberler[7] believe that international trade still has potential gains for developing countries and can develop their economy in different ways through, for example, technology transmission and economies of scale. According to Salvatore (2001:363) "as a developing nation accumulates capital and improves its technology, its comparative advantage shifts away from primary products to simple manufactured goods first and then to more sophisticated ones". A key point of disagreement is, therefore, whether developing nations are capable of improving their competitive advantage as a result of free trade.

These differences of opinion call for more empirical studies on the impact of trade liberalisation on specific economic sectors (the real place of changing comparative advantage) in developing nations. A key research question that arises is whether WTO membership actually changes the developing countries' production and export behaviour at the industrial level. Figure 1.1 summarises the potential mechanism by which

[7] Quoted in Salvatore (2001:365)

developing countries can improve their comparative advantage as a result of WTO membership, both in terms of inter-industry and intra-industry trade. This study aims to quantitatively test the strength of this mechanism which will be demonstrated in the next section. In the present research we investigate the effects of membership of the WTO on a special group of developing nations whose main exporting commodity is crude oil,[8] and to do this, we examine the changes in their export portfolios after WTO membership focusing on their export dependency on crude petroleum. Oil has been among the key export commodities of developing nations and provides a very high percentage of export receipts in a number of populous developing nations such as Nigeria and Iran. According to the Heckscher-Ohlin factor endowment theory, the oil industry[9] in these nations should be prioritised in economic development because they have a natural comparative advantage to produce and export crude oil. To become an engine of growth, the oil industry could shift the comparative advantage of these nations from primary products towards manufactured goods through either utilising advanced technology to produce more non-primary commodities in the industry or stimulating other sectors to produce and export more value-added commodities. In fact, the main mission of the oil industry in a developed country is not only to produce commodities to export, but also to prepare raw

[8] *Crude oil* is a mineral oil of natural origin comprising a mixture of hydrocarbons and associated impurities, such as sulphur. It exists in the liquid phase under normal surface temperature and pressure and its physical characteristics (density, viscosity, etc.) are highly variable. This category includes field or lease condensate recovered from associated and non-associated gas where it is co-mingled with the commercial crude oil stream. Crude is normally refined prior to use but it is sometimes burned directly in the power generation sector. (*International Energy Agency Users' Guide* - 2001 Edition)

[9] *Oil industry activities* consist of three different levels. The location and extraction of crude petroleum constitute the upstream end of the oil industry. Trading activities between the extraction and refining stages constitute the midstream end. The processing of crude oil into various refined products, together with the marketing of these products, is known as the downstream end. (Brown, 1990)

materials and energy for other parts of the economy. Utilising the oil industry as the engine of growth in oil exporting nations on one hand could increase the number of competitive sectors which appear in the shape of export diversification, and on the other hand could decrease their economic dependency on crude petroleum exports.

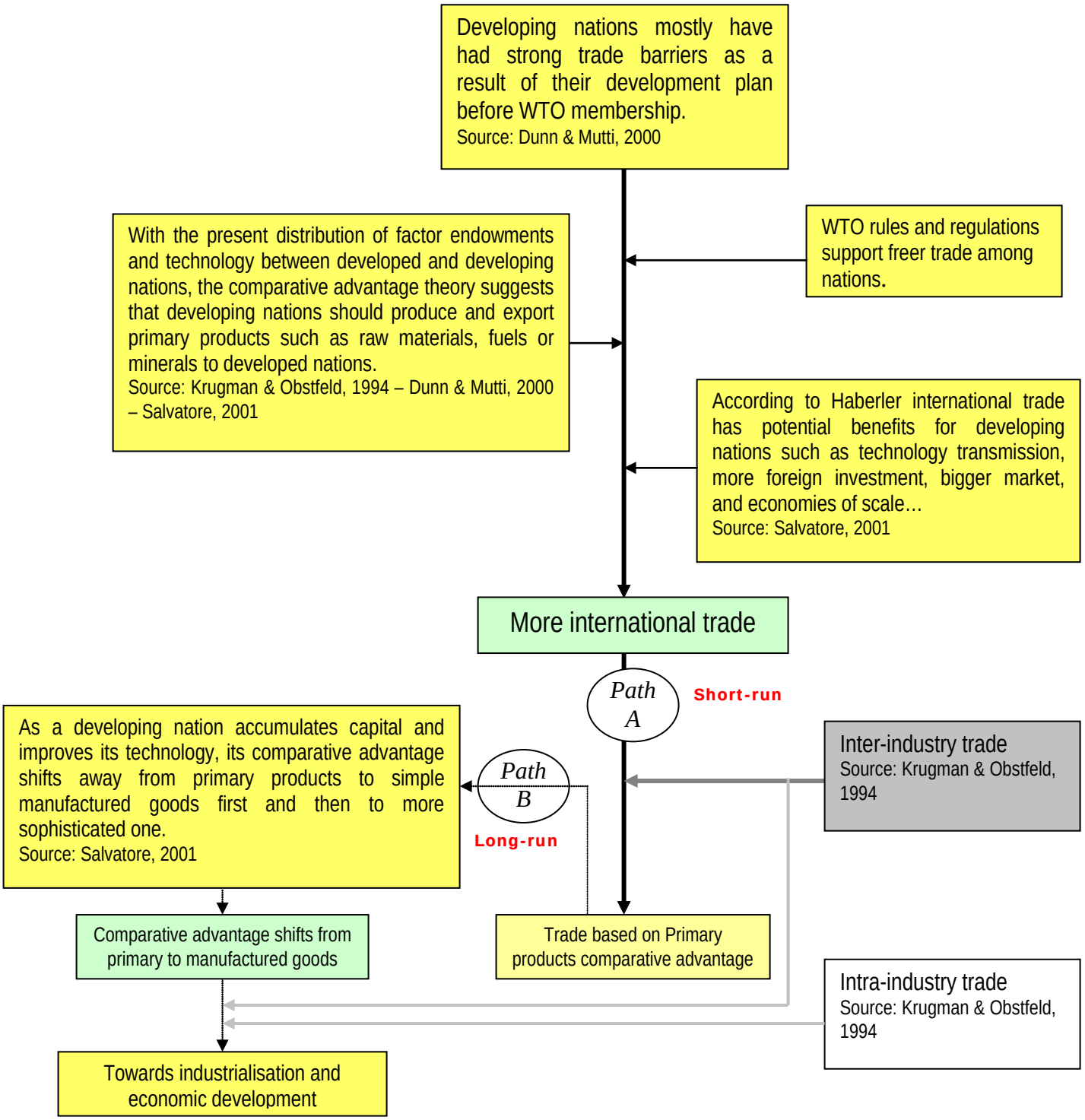
1.2 Aim of the Research

The trade-development relationship – which will be discussed in the next chapter – has been studied for nearly half a century. The target of this research is not to study the relationship itself, but to provide reliable evidence to examine the idea that there is a meaningful change in the export portfolio of oil exporters as a result of WTO membership. In other words, to evaluate whether there appear to be any systematic differences – before and after WTO membership – in the export mix of the countries whose natural resources have played an important role in their export earnings for a long time, we study the export dependency of these nations on crude oil. Also, to assist our investigation into the impact of WTO membership, we gather and analyse data about those oil exporters which are not members of the WTO.

In this study we focus on changing comparative advantage in oil exporting nations which – like other developing countries – have historically produced and exported mainly primary goods. With respect to this latter fact, we will carry out an export portfolio analysis on these countries to examine to what extent they have changed their export pattern after WTO membership. Figure 1.1 is derived from the results of most economic research (e.g. Salvatore, 2001) and indicates how freer trade potentially could help oil exporting nations to stimulate their international trade considering advance technology transfer, more effective capacity utilisation and so forth.

Figure 1.1: Potential short-run and long-run benefits

from Free Trade to Developing Nations



As Salvatore (2001) pointed out, trade liberalisation can stimulate developing nations to produce and export primary commodities in the short-run and then as a result of changing comparative advantage they can experience higher level of industrialisation in future. It is important to say that when oil exporting nations try to accumulate capital with focusing on exploiting and extracting their domestic natural resources, this process may have a negative impact on their industries which are active in these countries due to an economic syndrome known as the Dutch Disease. As Salvatore indicates "The nation's exchange rate might then appreciate so much as to cause the nation to lose international competitiveness in its traditional industrial sectors." To prevent such kind of problem, these nations should try to use the huge temporary capital inflow to create permanent wealth. In the next chapter we briefly explain the issue and the related activities which can be done to control the disease or to reduce its effects.

As Figure 1.1 shows these nations could be either on path ***A*** or on path ***B***. Nations on path ***A*** produce and export more products based on their present factor endowments with no significant change in their comparative advantage. Increasing capacity utilisation, for example, may help them to extract, produce and export more crude oil on path ***A***. In this case they concentrate on exporting primary products as in the past. Doing this could be easier than being on Path ***B*** and even in the short-run may be profitable, but according to economic theories countries on path ***A*** focus more on inter-industry trade.[10] Consequently, in the long-run there will be a big challenge especially for those nations which have relied on their non-renewable, natural resources to earn money from international trade. In the short-run every nation is expected to be on this path, but in

[10] Trade based on *comparative advantage* which occurs when Home and Foreign nations' capital-labour ratios are considerably different. (Krugman and Obsfeld-1994)

order to reap the dynamic benefits of freer trade they need to leave path ***A*** as soon as possible by shifting their comparative advantage towards manufacturing goods. In contrast, path ***B*** – which could lead to more intra-industry trade[11] and other dynamic benefits as a result of comparative advantage change – is supposed to be the first gate towards industrialisation and value-added activities. The main aim of this study is systematically to find the path which oil exporters have followed (path A or path B) after WTO membership.

To do this, the present research focuses on the oil exporting nations, consisting of 20 countries whose annual export earnings had been highly dependent on their crude oil revenue with a crude oil export ratio (CER)[12] of more than 30 percent in terms of value (on average) before WTO membership (for member-states)[13] and before 1995 (for non-members)[14]. These nations have been represented in bold type in Table 1.1. The table indicates proved oil reserves of nations which potentially could be considered as oil exporters in 2003; among these countries some nations like Australia, Brazil, China, Denmark, India, Italy, Peru, Romania, Thailand and the United States of America, which have been more crude oil importers than exporters during the last two decades,[15] will be omitted. Moreover, because the trade and industrial data was not available for some nations such as Sudan, Iraq and the former Soviet Union nations from 1986, this study does not cover these countries.

[11] Trade based on *economies of scale* which occurs when Home and Foreign nations are similar in their capital-labour ratios. (Krugman and Obsfeld-1994)
[12] CER will be discussed in section 1.5.
[13] See WTO members list (2004) in Appendix 1.
[14] For more information see Appendix 2.
[15] For more information see UNCTAD Handbook of Statistics 2005, SITC 333.

Table 1.1: World Oil proved reserves (2003)

Oil: Proved reserves	Thousand million barrels (at end 2003)	Share of total	R/P ratio
USA	30.7	2.7%	11.3
Canada	16.9	1.5%	15.5
Mexico	16.0	1.4%	11.6
Total North America	63.6	5.5%	12.2
Argentina	3.2	0.3%	11.0
Brazil	10.6	0.9%	18.7
Colombia	1.5	0.1%	7.3
Ecuador	**4.6**	**0.4%**	**29.6**
Peru	1.0	0.1%	28.4
Trinidad & Tobago	1.9	0.2%	31.1
Venezuela	**78.0**	**6.8%**	**71.5**
Other S. & Cent. America	1.5	0.1%	24.8
Total S. & Cent. America	102.2	8.9%	41.5
Azerbaijan	7.0	0.6%	61.2
Denmark	1.3	0.1%	9.5
Italy	0.7	0.1%	19.0
Kazakhstan	9.0	0.8%	22.3
Norway	**10.1**	**0.9%**	**8.5**
Romania	0.9	0.1%	20.6
Russian Federation	69.1	6.0%	22.2
Turkmenistan	0.5	0	7.1
United Kingdom	4.5	0.4%	5.4
Uzbekistan	0.6	0.1%	9.8
Other Europe & Eurasia	2.1	0.2%	11.9
Total Europe & Eurasia	105.9	9.2%	17.1
Iran	**130.7**	**11.4%**	**92.9**
Iraq	115.0	10.0%	*
Kuwait	**96.5**	**8.4%**	**
Oman	**5.6**	**0.5%**	**18.5**
Qatar	**15.2**	**1.3%**	**45.5**
Saudi Arabia	**262.7**	**22.9%**	**73.3**
Syria	**2.3**	**0.2%**	**10.5**
United Arab Emirates	**97.8**	**8.5%**	**
Yemen	**0.7**	**0.1%**	**4.2**
Other Middle East	0.1	0	6.1
Total Middle East	726.6	63.3%	88.1

Table 1.1: World Oil proved reserves (2003) – continued

Oil: Proved reserves	Thousand million barrels (at end 2003)	Share of total	R/P ratio
Algeria	**11.3**	**1.0%**	**16.7**
Angola	**8.9**	**0.8%**	**27.5**
Cameroon	**0.2**	**0**	**9.0**
Rep. of Congo (Brazzaville)	**1.5**	**0.1%**	**17.1**
Egypt	**3.6**	**0.3%**	**13.2**
Gabon	**2.4**	**0.2%**	**27.0**
Libya	**36.0**	**3.1%**	**66.3**
Nigeria	**34.3**	**3.0%**	**43.1**
Sudan	0.7	0.1%	7.5
Tunisia	0.5	0	20.8
Other Africa	2.3	0.2%	17.5
Total Africa	101.8	8.9%	33.2
Australia	4.4	0.4%	19.3
Brunei	**1.1**	**0.1%**	**14.1**
China	23.7	2.1%	19.1
India	5.6	0.5%	19.3
Indonesia	4.4	0.4%	10.3
Malaysia	4.0	0.3%	12.5
Papua New Guinea	0.4	0	22.5
Thailand	0.7	0.1%	8.7
Vietnam	2.5	0.2%	18.4
Other Asia Pacific	0.9	0.1%	15.4
Total Asia Pacific	47.7	4.2%	16.6
TOTAL WORLD	1147.7	100.0%	41.0
Of which OECD	85.8	7.5%	11.1
OPEC	882.0	76.9%	79.5
Non-OPEC £	178.8	15.6%	13.6
Former Soviet Union	86.9	7.6%	22.7

Source: BP Statistical Review of World Energy June 2004 [online]

* Over 100 years

^ Less than 0.05

◆ Less than 0.05%

£ Excludes Former Soviet Union

n/a not available

Notes: Proved reserves of oil - Generally taken to be those quantities that geological and engineering information indicates with reasonable certainty can be recovered in the future from known reservoirs under existing economic and operating conditions.

Reserves/Production (R/P) ratio - If the reserves remaining at the end of any year are divided by the production in that year, the result is the length of time that those remaining reserves would last if production were to continue at that level.

Source of data: The estimates in this table have been compiled using a combination of primary official sources, third party data from the OPEC Secretariat, World Oil, Oil & Gas Journal and an independent estimate of Russian reserves based on information in the public domain.

The reserves figures shown do not necessarily meet the United States Securities and Exchange Commission definitions and guidelines for determining proved reserves nor necessarily represent BP's view of proved reserves by country.

The figure for Canadian oil reserves includes an official estimate of Canadian oil sands "under active development".

Oil includes gas condensate and natural gas liquids as well as crude oil.

For the rest of the countries in the table (which are not major oil exporters) the oil industry may not act as a leading sector with a dependency of less than 30 percent on crude oil exports in terms of value. In fact, the oil exporting nations which we study in this research are those countries which own 70 percent of the world's proved oil reserves, and their oil industry, as one of the most important leading sectors, potentially could play a significant role in their development process.

Considering these 20 nations as the population of this research, we will investigate the crude oil export ratio (CER) and a variant of the Balassa revealed comparative advantage (RCA) index as industrialisation indicators in Angola, Brunei, Cameroon, Republic of Congo, Ecuador, Egypt, Gabon, Kuwait, Nigeria, Norway, Oman, Qatar, United Arab Emirates and Venezuela as WTO member-states and Algeria, Iran, Libya, Saudi Arabia, Syria and Yemen as non-members for the period 1986 to 2003 to find any meaningful change in their export pattern as a sign of industrialisation in these nations.

1.3 Research importance

Based on the related literature, it seems that most empirical studies which have been done to analyse the robustness of the relationship between trade liberalisation and development have emphasised some economic performance indicators like total factor productivity (TFP),[16] per-capita GDP, (e.g. see Dollar, 1992) and income.[17] Instead of these factors, in the present research we focus on the changes in the primary commodities' share in the export basket (CER) whose meaningful decrease could be considered as a very important characteristic of successful development. Indeed, by focusing upon these useful national

[16] For more information see Edwards (1998)
[17] Frankel and Romer (1999)

economic indicators, previous researchers have tried to imply the overall effects of the trade policy orientation on the development process in different nations. Despite their serious quests trade-development debates still continue because there are some measurement limitations both on the trade and the development side. For example, measuring the degree of liberalisation of a trade policy is a complex concept and can be difficult to interpret. Therefore, it is usually difficult to find an acceptable widely-used proxy to identify the exact changes in the degree of openness from trade policy to trade policy. Moreover, on the development side, changes in the economic growth indices do not tell us how much the country has developed as a result of a new trade policy implementation.

According to the World Bank definition, we could use 630 different indicators[18] to show a variety of development aspects in a nation, which means that growth change is not an easy phenomenon to measure. Managing the mentioned difference analysis could be vital to assess the progress of developing nations towards their development targets especially when countries reform their trade policy. To do this in a different way, we focus on industrialisation – as one of the most important characteristics of growth – rather than development. In the present research, besides doing an export portfolio analysis, we concentrate on *industrialisation change indices* which create a more solid and tangible foundation to understand the role of each leading sector in different development stages. Based on this method, we firstly study CER as the crude/non-crude mix of annual exports to find the changes in economic dependency on crude petroleum in oil exporting nations. Then, at the second stage, we investigate the diversification of exports which indicates

[18] It is beyond the scope of this research to discus these indicators, for more information, see world development indicators (WDI, 2005) in the Appendix 3.

"the desire to foster economic growth and enhance export earnings stability (Stanley and Bunnagi, 2001; Gutierrez de Pineres and Ferantino, 1997)."[19] In the absence of these changes which can be considered as a big industrial push for these nations, they may lose the long-run dynamic benefits of international trade activities (Path ***A*** in Figure 1.1).

Although this long-run threat is a general problem for all developing nations, it could be even more dangerous for oil exporting nations as a special group of developing countries whose natural resources are the main source of their export earnings, for three reasons. First of all, natural resources are limited and non-renewable and the day will come when there is nothing left to extract. Therefore, these nations have to reduce the dependency of their economic systems on these resources and consequently they have to change their production behaviour as soon as they can. Secondly, concentration on one particular primary product could be dangerous if the price of the product were not stable. Indeed, as Dunn and Mutti (2000) have said during the twentieth century, primary product prices have been considerably more volatile than manufactured goods prices. Finally, although crude oil could be categorised into different groups[20] such as *light* or *heavy*, it still is a primary product which could hinder intra-industry trade in these nations. Based on Figure 1.1, trade liberalisation could probably stimulate international trade in developing nations but a key factor to being successful in global trade is product differentiation. Kay (1995: 211) in his book, *Foundation of Corporate Success* states "when people say, 'A developing economy should move to higher value added activities' they do not mean that

[19] Quoted in Taylor (2003)

[20] Crude oils are broadly categorised as light (paraffinic), medium (mixed-base) or heavy (asphaltic) and are precisely graded on a specific gravity scale devised by the American Petroleum Institute (API). Under this system water is allocated a value of 10° API and crudes lighter than water have progressively higher values (a 30° API rating being equivalent to a specific gravity of 0.876 at a temperature of 60° Fahrenheit). (G. Brown, 1990: 5)

the degree of vertical integration should be increased. They advocate a shift to more highly differentiated products". Indeed, with regard to comparative advantage theory most of the trade between developing nations and developed countries is supposed to be inter-industry (Path ***A*** in Figure 1.1) but not intra-industry trade (Path ***B*** in Figure 1.1) which is based on economies of scale when the capital-labour ratios between two nations are similar and enable these nations to be more industrialised. In sum, an export diversification analysis can allow for a better understanding of the impact of WTO membership on industrialisation and economic development in developing nations more generally than previous studies which have relied on the degree of liberalisation or development indicators.

1.4 Research questions

Comparative advantage may shift as a result of changing production factors, technology or attitudes over time, but the main question is how we can investigate and demonstrate these changes. The final results of changing the above-mentioned factors could be observed in developing nations' products which are exported every year. Therefore, we can focus on their export basket to find out to what extent they are different, and this is the main reason for doing an export portfolio analysis of oil exporters. In fact, the oil industry as their main leading sector could shift the overall country's comparative advantage from primary products to manufactured goods, either through producing more energy or raw materials for other parts of the economy or through investing in other sectors[21] which could help them to produce more non-primary products or even both.

[21] Also Foreign Direct Investment (FDI) could support industrialisation process in these nations if it would be used to change their comparative advantage from primary to complex commodities production and export.

Table 1.2: The oil industry in selected industrialised nations

Nations	CER (%)		Total petroleum export ratio	
	1986	2003	1986	2003
Australia	1.95	4.67	4.51	6.73
Canada	3.13	5.37	4.15	7.55
France	0	0	1.50	1.43
Germany	0	0.04	1.14	0.87
Italy	0.02	0.06	2.70	2.01
Japan	0	0	0.13	0.28
Netherlands	0.24	0	9.63	4.63
Spain	0	0	5.86	2.24
United Kingdom	8.62	4.72	11.06	6.86
USA	0.06	0.02	1.33	1.11

Source: Authors calculation based on UNCTAD Handbook of Statistics 2005

Table 1.2, for example, indicates that the oil industry in developed nations may still substantially produce crude oil but not just for export like developing nations. In fact, the oil industry in developed nations provides energy for other sectors to enable them to be active in global competition. Moreover, industries which are leading sectors in developing nations do not play such an important role in developed countries. In addition, sustained economic growth through WTO-led trade liberalisation requires a big jump from a non-primary importer[22] and consumer position in the global economy (Path ***A*** in Figure 1.1) to a non-primary producer and exporter position (Path ***B*** in Figure 1.1). As a result, oil exporters are expected to rationally try to increase the share of manufactured goods in their export basket which may explain their serious intention towards industrialisation. We consider this point in our analysis as the target of any change in the crude oil share of the total in these nations' annual export basket.

[22] To see the negative points of primary products' export for example refer to Salvatore (2001)

Referring to the idea that says long-run economic growth based on freer trade depends on changing comparative advantage in the oil exporting nations, we expect to see an increase in total exports with more emphasis on CER reduction and export diversification in these nations. It should be kept in mind that if trade-led development and industrialisation are considered as the main goal of these nations to become WTO members, we should see negative impacts on CER accompanied by export portfolio diversification because of the following reasons:

1- Oil exporters mostly do not have any problem in producing and exporting crude oil, and their being major oil exporters supports this idea. In fact, their problem is revealed in the case of producing and exporting manufactured complex products.
2- With just one considerable product like crude oil in their current export portfolio, oil exporting nations take a very high risk in international trade. To be integrated in global trade with lower risk, these nations have to activate other sectors in their economies. (Risk Minimisation)
3- To maximise their profit from international trade these nations have to reduce the share of primary products including crude oil in their export portfolio. (Profit Maximisation)
4- Activating other sectors to produce and export more value-added products not only could directly reduce CER but also could increase domestic crude oil consumption, both as the source of energy or raw material which leads to a decrease in CER in an indirect way.

With respect to this idea, mining sectors, like the oil industry in these nations, which mostly produce and export primary products could improve their capacity and productivity after WTO membership. The positive short-run effects may improve their national welfare (path A), but as a result of the three following basic threats, oil exporters still have to change their primary comparative advantage:

1- These kinds of natural resources are non-renewable.
2- There is a big global push to invent a new substitution for energy resources like crude oil (for more information, see Appendix 4).
3- More exports of primary products means less intra-industry trade which is the basic factor of international trade profitability.

Therefore, the sectors that produce primary products will contract in the long-run as a result of technology that has been transmitted intentionally with the purpose of economic growth, and newly expanded industries which could produce manufactured commodities may improve their dynamic benefits and welfare (Path B). As Taylor (2003) pointed out, production efficiencies which could be improved by technological innovation allow various industries to be more competitive. Increasing the number of competitive sectors with a considerable export of commodities, in turn, can be seen in the shape of export diversification in these nations. While the causal factors behind these relationships have been discussed in different studies previously, in the present research, to address any changes in the comparative advantage of oil exporting nations which may help them to gain the most profit possible from international trade, we will try to investigate the following questions:

Questions which will be discussed in the first phase of the research:

A – 1 – Has the degree of openness which will be measured by freedom to trade internationally (FTI)[23] in oil exporters shown a meaningful increase after their membership of the WTO?

A – 2 – Has WTO membership had a negative impact on the share of crude oil in petroleum exporting nations' total exports (CER)?

A – 3 – Have oil exporters which are WTO member-states declined their CER to a greater extent than non-members between 1986 and 2003?

Question which will be discussed in the second phase of the research:

B – Has the export portfolio of oil exporting nations diversified after their membership of the WTO?

To investigate the questions in part A – which are intended to find what really happened in oil exporting nations after their membership of the WTO – and for simplicity, we assume that they only produce and export two products. According to the crude oil importance for these countries before WTO membership, and in order to show the change in the importance of this primary product after membership which could be considered as a meaningful shift in their comparative advantage, we suppose that each country just exports crude oil (first commodity) and other products (second commodity), which means that we call all non-crude oil commodities non-primary products. Utilising this assumption is helpful because crude oil is a primary product, and in this way we show its real importance in these nations. Therefore, wherever we refer to export mix in the first phase of this study, we will have a combination of just two commodities in these

[23] FTI which shows the degree of openness will explain in section 4.1.2.

countries which are crude oil (as primary) and non-crude oil (as non-primary) products. With respect to this assumption other sectors just produce and export non-primary commodities. Keeping what we assume in mind, we categorise the sample into two different groups, WTO-members and non-members, to compare them with each other through a systematic with-without and before-after procedure of differences analysis.

1.5 Research methodology

Changing the production and export pattern, which may lead a nation to change its comparative advantage from primary to manufactured goods, can be assumed to have a meaningful relationship with some other important changes as follows:

1. Shifting the level of technology through capturing and absorbing new modern ideas from advanced technology leaders.
2. Changing production factors in the industry which is supposed to be a supportive force to shift overall comparative advantage.

In this study, in order to investigate the annual export dependency of oil exporting nations on crude oil, and also export diversification changes before and after WTO membership which indicates changing comparative advantage in petroleum exporters, we focus on the crude oil export ratio (CER) and revealed symmetric comparative advantage (RSCA) as basic industrialisation indicators. To do this, as the first step, we calculate CER and export trade off value (ETOV)[24] based on crude oil exports (XC) and total annual exports (TE) in terms of value, with the following definitions and formulas to examine export portfolio changes in a with-without and before-after design:

[24] As an alternative factor for CER

1 – Crude oil export ratio (***CER***) which is measured as the ratio of crude oil exports to total exports of the nation in the same year. The value of CER ranges from 0 to 100. When CER is 0, it means that the nation only exports non-primary products,[25] and when it is 100, it indicates that the nation only exports crude oil. A negative relationship between this ratio and WTO membership usually indicates the tendency of the nation to export more non-primary products which could lead to a lower dependency of the economy on crude oil exports.

XC = *Crude oil exports*, (m $)-US Dollar at current price

XO = *Total national non-crude oil exports*, (m $)-US Dollar at current price

TE = *Total exports*, (fob, m $)-US Dollar at current price

CER = *Crude Oil Export Ratio*

i, is referred to each particular year (i = 1986, …, 2003)

$$XO_i = TE_i - XC_i$$

$$CER_i = \frac{XC_i}{TE_i} \times 100\%, \qquad 0 \le CER_i \le 100.$$

2 – Export trade off value (ETOV) indicates how a nation has exchanged two different commodities with each other (e.g. in this research the specific volume of crude oil in terms of value in exchange for the same value of a specific amount of non-crude oil products or *vice versa*). It is calculated as the ratio of $crude/non-crude$ trade off to their relative value in the same period. The value of ETOV ranges from -100 to +100. When ETOV is +100, CER2 is

[25] Based on the research assumption at this stage of the analysis all non-crude oil commodities are supposed to be one value-added product.

0, in this case the nation just exports non-primary products, and when it is -100, it indicates that the economy only exports crude oil. This indicator will be discussed in chapter three, section 3.4.

In the second step, we study the revealed symmetric comparative advantage (RSCA) which is calculated based on Balassa's (1965) revealed comparative advantage index (RCA). This indicator shows how a nation could be considered as specialised or non-specialised to produce and export a specific commodity. This index varies between -1 and +1. When the share of national exports of a commodity exceeds those of the reference group,[26] RSCA – which is between (0) and (1) – shows some degree of specialisation. In contrast, when $-1 \langle RSCA \langle 0$ it indicates some degree of non-specialisation.[27]

According to Taylor (2003) the RCA equation for industry i and country j could be written as follows:

$$RCA_{ij} = \frac{X_{ij} / \sum_i X_{ij}}{\sum_j X_{ij} / \sum_i \sum_j X_{ij}}$$

where X_{ij} denotes the exports to the world of industry i and country j. In brief, to show the shift of comparative advantage based on these indicators and variables, according to Figure 1.2, first of all, we gather and summarise related secondary data which is supposed to be collected from governmental and official reliable data sources such as British Petroleum (BP), the Organisation of Petroleum Exporting Countries (OPEC) or the United Nations Conference on Trade and Development (UNCTAD). Secondly, based on the *Trade off Analysis Model* which will be fully discussed in a separate chapter, the target of the change (being on path B) and the change comparison point will be added to

[26] Group of nations which have been studied in this research
[27] For more information see Taylor (2003)

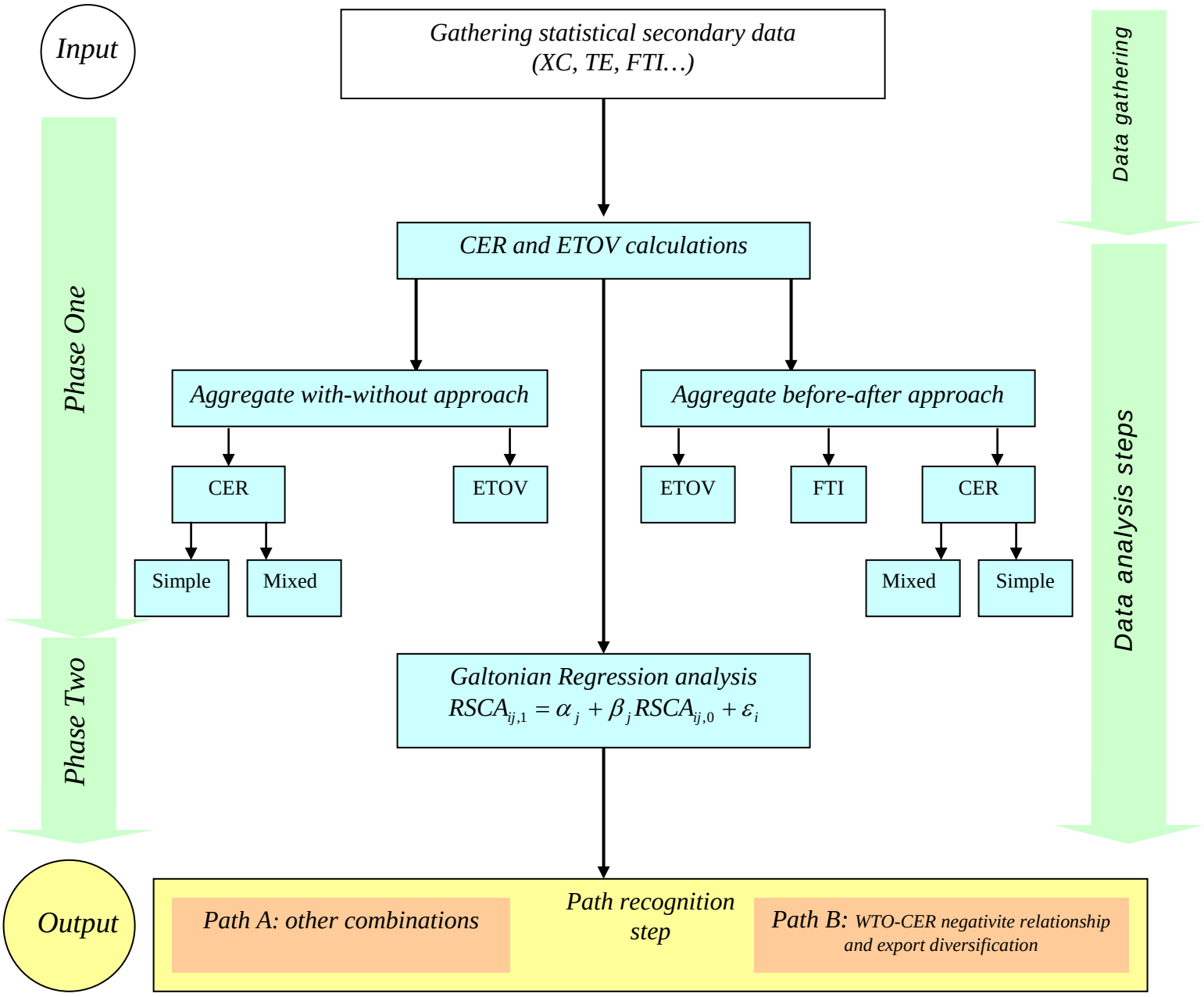
the model to recognise and measure any meaningful change in all sample nations. In fact, in the case of CER analysis we could not say whether a change is successful or not without considering a specific goal to be reached by these nations, which here, in this research, is to increase the level of total exports (TE) with condition of emphasising the expansion of non-primary commodities.

Utilising this target in the model as the basic criteria is important because in order to see a change in the comparative advantage from primary to manufactured goods these nations should increase the share of non-primary exports in their total exports. In this model, θ, and λ[28] will be calculated with regard to the related input variables, both for WTO members and non-members where their different interrelationships and combinations indicate different scenarios concerning the export behaviour of oil exporters.

Then based on the with-without and before-after approaches we compare WTO member-states and WTO non-members which respectively are considered as the treatment and control group in this study. Also, we utilise a Galtonian regression to compare the distribution of the RSCA for each nation before and after WTO membership. Finally, the results of this study indicate how FTI, CER and RSCA have changed before and after the comparison points. This methodology can be employed for analysing change not only with regard to oil exporters but also all developing nations with a high export dependency on a few important products. In addition, although at the first stage of this study we suppose that oil exporters just produce and export two different commodities, it is possible to categorise all different products according to standard international trade classification (SITC) definitions.

[28] $\Delta XC = XC_{i+1} - XC_i = \theta$, and $\Delta XO = XO_{i+1} - XO_i = \lambda$ where Δ denotes change of the variable between year (i) and $(i+1)$.

Figure 1.2: Two Phase Analysis Model [29]



[29] The model and all indicators will be fully discussed in chapter 3.

This creates a basic foundation to start investigating the share of every specific product or specific group of products in the total exports of a country and its probable changes based on three or more groups of commodities. For example, we could have three groups of classified commodities with different weights in the nation's total exports basket such as primary, simple manufactured goods, and manufactured goods. As one of the most important features, we should say that the present methodology can create a tangible basic foundation to measure and understand industrialisation changes over time.

1.6 Research limitations

As with every other research, there are limitations to the interpretation of the results and other issues which should be considered when utilising the findings of the present study. We can classify these issues as follows:

1- The accuracy of the results in this study rigorously depends on the administrative data which has been collected from each specific source. There is always a possibility of data inaccuracy which is a function of the data provider's work. However, we have used the most reliable datasets from resources such as UNCTAD or OPEC in this research to minimise these uncontrollable impacts.

2- There are nations like Iraq or Azerbaijan whose data can not be collected, although these countries could be considered as important oil exporters. The importance of these nations is revealed especially when trying to compare WTO member-states with non-members. In spite of this data limitation, we have tried to investigate the biggest possible set of oil exporting nations in the research population.

3- It may take a longer time to reveal the impact of WTO membership on the economy of each member. In this research the longest possible time period after WTO membership is 9 years between 1995 and 2003. Investigation of a longer period of time may yield better results. However, the findings of the present research may stimulate researchers to think about and to study related subjects in the knowledge area in the future based on new factors.

1.7 Chapter Summary

To compare the industrialisation level in oil exporting nations before and after WTO membership in this chapter we have demonstrated a combined methodology based on CER and RSCA analyses. While the first indicator shows the economic dependency of oil exporters on crude petroleum, the other measures the export diversification changes in these countries at two points of time. Also, we explained the importance of the study and its related limitations. In the next chapter, we focus on the literature of the trade-development and industrialisation studies in order to become familiar with the different methods which have been utilised to improve the related knowledge area.

Chapter 2

Research Literature Review

Introduction

The trade-development relationship which we focus on as the overall framework of the present study has been discussed by different researchers for a long time, especially after World War II. Indeed, the importance of the industrialisation and sustained economic growth issues largely stimulated developing nations to search for a rational strategic way to develop their economic systems in order to escape from the vicious poverty circle, and as we will see, international trade freedom is supposed to be a remedy to treat the weak economies. This chapter provides a clear picture of the history of trade-development and industrialisation studies and the related research difficulties in this knowledge area. Also, the literature review focuses on WTO membership, its effect on the economy of different nations and features of the related studies. These characteristics indicate there are still key points in the existing knowledge area which need to be investigated. Then, in a quest to expand the related field of study, this chapter demonstrates export portfolio investigation as a basic foundation to discuss the changes in the industrialisation level in WTO member-states.

2.1 Export-led Growth versus Import-Substitution Industrialisation (ISI)

From economic thinkers such as Alexander Hamilton in the late 18th century to Raul Prebisch in the mid 20th century, arguments have been made to support import-substitution strategies as the best strategy for helping infant industries in developing countries (Staley, 1989:199). After World War II most developing nations, which were predominantly primary commodities exporters, seriously tried to improve their economies by adopting import substitution in order to be more independent, self-sufficient and industrialised. In fact, at that time, they really believed that per-capita income and, consequently, the level of social welfare in developing countries, was lower than that of the developed nations because of the low prices of primary products such as raw materials and agricultural goods around the world which had direct effects on their export earnings. Therefore, holistic trade policy reforms were applied in these nations to stimulate economic growth based on import substitution strategy.

The effective rate of protection for consumer durables which was measured by Balassa (1971) in several developing nations such as Brazil (285 percent), Chile (123 percent), Mexico (85 percent), Malaysia (-5 percent), Pakistan (510 percent), and the Philippines (81 percent) indicate the extremism of the import-substitution policy during the 1960s.[30] As Krueger (1998:1513) says "The belief then was that rapid *industrialisation* was the essential (if not the sole) feature of economic growth." As a result of this latter idea and to start the process of industrialisation, they allocated most of their resources to import-competing activities with importing investment and intermediate goods from the developed countries. The demand for foreign exchange grew even more rapidly than

[30] Quoted in Dunn and Mutti (2000)

export earnings and led to foreign exchange shortages; therefore these nations used a restrictive trade regime to support their development plan. Although it seems that one of the most important reasons for these countries to utilise this strategy was to move from primary products to the position of being a manufactured goods exporter in the global economy, as history tells us, the results were very different. Salvatore (1996:24) believes that they strongly opted for this policy based on heavy protection which generally led to very inefficient industries and very high prices for domestic consumers. As he pointed out, "sometimes the foreign currency value of imported inputs was greater than the foreign currency value of the output produced (negative value-added)".

In 1978, Falvey used Gruen and Corden's three commodity model to explain the relationship between a restrictive trade policy and industrialisation. To do this, the proportion of the labour force employed in the industrial sector was considered as a proxy for industrialisation in this research, and findings showed that an import-substitution policy could be successful in the short-run, but may not be so in the long-run. According to Greenaway and Nam (1988:422), "typically the initial stages of industrialisation are characterised by inward orientation. It is generally only after some 'take-off' point when resources need to be mobilised into higher value-added activities that outward orientation occurs." They believe that the import-substitution method leads to home market bias with emphasis on export instability, terms of trade decline, and the operation of multinationals and infant industries,[31] while an export-led strategy means there is no difference between export and domestic markets, with a focus on the dynamic growth processes, economies of scale and market size.

[31] Little (1982) and Kirkpatrick (1987) have evaluated the rationale behind these strategies. (Quoted in Greenaway and Nam-1988)

Dunn and Mutti (2000) argued that an import-substitution policy could be successful only if it was utilised in a limited period of time, and more importantly, in some precisely chosen industries. Here, historical records could help, for example, some countries like Korea and Taiwan did well in their competitive labour intensive industries to improve their potential comparative advantage and then moved away from it to a free trade strategy, but most developing nations have used this policy for decades. As Salvatore (1996:25) has mentioned "[it] resulted in waste of up to 10% of the country's national income (see Chenery, 1986; Chenery and Syrquin, 1974; Little et al., 1970; Pack, 1989)". Therefore, in the 1960s, with regard to the negative long-run effects of an import-substitution strategy on growth, some nations like Korea, Taiwan, and Singapore changed their trade policies to an export-led strategy – by replacing quantitative restrictions (QRs) with tariffs, reducing and simplifying import tariffs and taxation, reducing impediments to exports, as well as eliminating or reducing currency overvaluation – and the result was a noticeable economic growth.

According to Krueger (1998), in less than two decades this trade policy reform affected their per-capita income impressively and these nations were classified as being among the high-income countries in the world.[32] In the 1970s some important studies[33] such as *Industry and Trade in Some Developing Countries: A Comparative Study* by Little, Scitovsky and Scott (1970), *Foreign Trade Regimes and Economic Development: Anatomy and Consequences of Exchange Control Regimes* by Bhagwati (1976) and *Foreign Trade Regimes and Economic Development: liberalisation attempts and*

[32] As Krueger (1998) said: "The World Bank now classifies Korea, Hong Kong and Singapore as high-income *countries*. See World Bank (1997), pp. 214-5. Taiwan is not included in the Bank's World Tables, but has a higher per capita income than Korea."
[33] Quoted in Dunn and Mutti (2000)

consequences by Krueger (1976) were published to emphasise the point that an export-led strategy could lead to faster growth than import-substitution, and the main focus of these studies were the *Four Tigers* which refer to Hong Kong, Taiwan, Singapore and Korea.

2.2 Trade –Development Related Research Difficulties

After the first wave of Asian Newly Industrialised Countries (NICs), which were very successful economically, the second wave occurred and Indonesia, Thailand, Malaysia and China started economic development based on an export-led strategy, and, as history tells us, they have grown rapidly.[34] Indeed, their performance persuaded some economists to consider the relationship between trade liberalisation and growth, although the idea that international trade could help growth is very old. As Edwards (1993:1358) pointed out "the idea that international trade is [an] engine of growth is very old, going back at least to Adam Smith."

For near half a century researchers have tried to find a rational way to clearly explain this relationship (e.g., Edwards, 1993; Salvatore, 1996; and Edwards, 1998) but controversies still continue today as a result of substantial complexities in the area of these studies. For example, definitions of liberalisation and openness, and methods of measurement of liberalisation and openness have been different from study to study. Moreover, formulating proxies to indicate any meaningful change in trade policy in some cases have been confusing (e.g., Greenaway *et al.,* 1998). Also, there are miscellaneous environmental factors which can have an impact on the trade-development relationship.

[34] Dunn and Mutti (2000)

Therefore, the results tend to vary from sample to sample and from time to time (e.g., Greenaway *et al.,* 1998). In the rest of this section we focus on the above-mentioned difficulties in the related literature.

For a long time there have been controversies among economists about the methods of measuring the degree of openness or liberalisation as one of the most important criteria for trade policies in a nation. According to Balassa (1982), the early cross country comparative studies utilised the trade dependency ratios or the rate of export growth as a proxy for openness, but he believes that these indicators are not necessarily related to trade policy and moreover they are largely endogenous.[35]

In order to solve these problems, some researchers have focused on the degree of trade distortion to show the degree of openness in a nation. For example, the Heritage Foundation Index of trade policy classifies nations into five different groups[36] based on the level of tariffs and other distortions. Leamer (1988) utilised the Hecksher-Ohlin model with nine factors to calculate net trade flows and trade intensity ratios for 183 commodities at the three digit standard international trade classification (SITC) level for 53 nations. Then, he measured the trade barrier indictor by calculating the differences between predicted and actual trade intensity ratios. Papageorgiou *et al.* (PMC) in 1991 developed a subjective index to show the degree of trade liberalisation in their research. Also, indicators like tariff averages, average coverage of quantitative restrictions, and collected tariffs ratios (the ratio of tariff revenues to imports) have been used as a proxy for openness based on their observed value. In 1994 Anderson calculated the Anderson-

[35] Quoted in Edwards (1998).

[36] These five groups respectively from the highest economic freedom level to the lowest are: Free, Mostly Free, Moderately Free, Mostly Unfree and Repressed. For more information refer to: http://www.heritage.org

Neary indicator for 23 nations, and based on this calculation, he found out that a weighted average tariff usually underestimates the true degree of trade restrictions.[37] Sachs and Warner in 1995 used a combination of factors like tariffs, quotas coverage, black market premium, social organisation and the existence of export marketing boards to construct an openness index. These studies have led to the proliferation of very disparate methods of measuring the degree of liberalisation.

Edwards in 1998 studied the connection of openness and productivity growth with nine indexes of trade policy based on a new comparative data set for 93 countries to answer the question whether *Total Factor Productivity* (TFP) growth is faster in more open economies. Three of these indexes measure openness, which are *Sachs and Warner openness index*: this is a binary indicator which is (1) if the nation's economy is open and is (0) if it is closed in that year, *World Development Report Outward Orientation Index* which classifies nations into four groups based on their perceived degree of openness and the *Leamer openness index* (1988): it is estimated as the average residuals from disaggregated trade flows regressions. In addition, his indexes consisted of six trade distortion indicators which are: *Average Black Market Premium, Average Import Tariff on Manufacturing, Average Coverage of Non Tariff Barriers, The Heritage Foundation Index of Distortions in International Trade, Collected Trade Taxes Ratio* and *Wolf's Index of Import Distortions*.

Greenaway *et al.* (1998) classified the approaches to measuring the degree of liberalisation into three different groups. Firstly, *policy accounts* which refer to any perceived changes in the policy environment. For instance, Papageorgiou *et al.* (PMC) in

[37] Quoted in Edwards (1998).

1991 used this method in a cross-country study with 18 episodes for 19 nations. Secondly, measuring *relative price changes* which is an alternative way to make different liberalisation proxies. Bhagwati (1978) and Balassa (1982) utilised this method in their multi-country studies.[38] The third approach was called *Output based measures* which was used by Easterly *et al.* in 1997 including some different macroeconomic indicators or trade intensity measures. As they indicate, it seems that the afore-mentioned straightforward indices could not completely reflect liberalisation changes, and as a result, some researchers have started to utilise a variety of *multiple criteria* as a proxy for liberalisation. Dean *et al.* in 1993 used a set of four different criteria which include import tariffs, quantitative restrictions, export impediments/incentives and degree of exchange rate misalignments for 31 nations.

According to Clark *et al.* (1999) the earliest trade policy proxies which have been used by researchers like Balassa (1978), Ram (1985) and Otani and Villanueva (1990) have focused on export growth rates, but they believe that "the connection between export oriented trade policies and export levels is more assumed than proven." In addition, they mentioned that because exports are part of GDP, a positive relationship is expected between export growth rates and GDP growth in spite of any theoretical link between them. Others like Donges and Riedel (1977), Balassa (1978), Dollar (1992) and Edwards (1992), have modelled the relationship between trade policy and output growth more explicitly. Greenaway *et al.* (1998) believe that it is important to separate the effects of trade policy reform from other policies in the nation. In addition, recognising a time interval for assessing the related effects of trade policy on growth could be a critical

[38] Quoted in Greenaway, Morgan and Wright (1998).

function which differs from nation to nation, and to do this, researchers have used different analysing methods including "with-without", "before-after" and "Panel view" based on cross-country and time series[39] data sets. "With-without" which has been used, for example, by Mosley *et al.*[40] in 1991, involves two comparable country groups where one of them is subject to trade reforms and the other group is not, and any differences in performance between these groups are supposed to be as a result of trade reform programmes. "Before-after" which has been utilised by Greenaway in 1997, is like the "with-without" method but it considers a time dimension to compare "with-without" before and after the comparison point.

2.3 Trade-Development and Industrialisation Studies

Based on a variety of different trade liberalisation proxies which have been discussed in the previous section, researchers have studied the relationship between trade policy orientation and growth, but they have not reached a rigorous conclusion in this matter yet. Kravis in 1970 pointed out that international trade can greatly facilitate and support growth more as a "handmaiden" than as an engine of growth,[41] and a large number of empirical studies such as Salvatore (1983, 1992), Reidel (1984), Ram (1987), Salvatore and Hatcher (1991), Dollar (1992), and Greenaway and Sapsford (1995) have confirmed this point of view. For instance, Greenaway and Nam (1988) classified nations based on their trade policy orientation utilising factors such as the effective rate of protection, direct controls on imports, export incentives and exchange rate alignment. With regard to data which covered the time period from 1963 to 1985 for 41 countries, they categorised

[39] For example see Harrigan and Mosley (1991), PMC (1991), Greenaway and Sapsford (1994), Greenaway, Leybourne, and Sapsford (1997) and Onafowora *et al.* (1996).
[40] Quoted in Greenaway, Morgan and Wright (1998).
[41] Quoted in Salvatore (1996).

developing nations into four different groups consisting of strongly outward-oriented, moderately outward-oriented, strongly inward-oriented, and moderately inward-oriented economies. Also, they used the annual average growth of manufacturing value-added, average share of manufacturing value-added in GDP, annual average growth of manufacturing employment, average share of labour force in industry, and annual average growth of manufacturing exports as the main industrialisation characteristics to investigate the relationship between trade policy and industrial performance.

Moreover, they studied the relationship between trade policy and macroeconomic performance by emphasising the annual average growth of real GDP, annual average growth of real per-capita GNP, annual average growth of merchandise exports, average gross domestic savings rate, average gross foreign savings rate, annual average incremental capital output ratio, and average dept service as a percentage of exports. Based on a sample of nations, which was not random but the only available data set of different countries of different sizes, at various stages of development in different geographical regions, they suggested that outward orientation could help and support industrialisation. Dollar (1992) studied 95 countries' source of economic development based on the apparent growth rate differences among Asian, Latin America and African nations. In his research, he examined the relationship between per-capita GDP and a combination of investment rate, real exchange rate distortion, and real exchange rate variability to indicate the impact of trade policy on growth. With regard to his findings, trade liberalisation, devaluation of the real exchange rate, and maintenance of a real exchange rate could help developing nations to improve their performance and growth rapidly. Greenaway *et al.* (1998) studied 73 nations based on the World Bank (1993),

Dean *et al.* (1994) and Sachs and Warner's (1995) criteria for the definition of liberalisation utilising a dynamic panel view model to find the short-run impact of liberalisation on GDP per-capita. As they mentioned, trade liberalisation, which has been inspired by the World Bank under its structural adjustment programme (SAP) for two decades, seems to be related to the overall performance of developing nations. They focused on a cross-section of countries applying a panel framework to find evidence to support any relationship between liberalisation and growth. They found that liberalisation and openness do impact favourably on the growth of gross domestic product per-capita, although according to the literature controversies the results depend on a lot of different factors such as sample, sample size, methods of formulating openness and liberalisation proxies, and different research methods. As Edwards (1998) said, the new growth theories of Romer (1986) and locus (1988) could support the idea that there is a relationship between free trade and development.[42] Moreover, Romer (1992), Grossman and Helpman (1991) and Barro and Sala-i-Martin (1995) indicated that open economies could absorb advanced technology better than closed economies. Frankel and Romer

[42] As Salvatore (1996:35) says: "Starting with Romer (1986, 1994), Lucas (1988) and Rodrik (1988), endogenous growth theory seeks to provide a more convincing and rigorous theoretical basis for the relationship between international trade and long-run economic growth and development. The new theory of endogenous growth postulates that lowering trade barriers will speed up the rate of economic growth and development in the long run by (1) allowing developing nations to absorb the technology developed in advanced nations at a faster rate than with a lower degree of openness, (2) increasing the benefits that flow from research and development (R&D), (3) leading to larger economies of scale in production, (4) reducing price distortions and leading to a more efficient use of domestic resources across sectors, (5) encouraging greater specialization and more efficiency in the production and use of intermediate inputs, and (6) leading to the more rapid introduction of new goods and services".

(1999) have investigated the impacts of trade on the standard of living by measuring its effects on income, and their findings could not support the relationship as they believe "correlations between trade and income cannot identify the effect of trade." In fact, they indicate that other factors such as the geographical situation of each country, which obviously is not a consequence of a nation's trade policy, can substantially help or hinder its trade and income. As Michalopoulos (1999:117) has pointed out, "developing countries, in general, have become more effectively integrated in the international trading system, and several have become major exporters of manufactures." He also mentioned that in many countries trade policies have been liberalised which has led to an outward orientation and lower protection in their competitive sectors.

In the history of trade-development studies, in order to find more tangible results, some researchers have focused on industrialisation rather than economic growth. For example, Clark *et al.* (1999:162) have investigated the impacts of outward-oriented trade policy on industrialisation rather than output growth. Indeed, they used manufacturing value-added growth rate instead of the growth rate of GDP to indicate the industry sector growth as a proxy for industrialisation. They tested the relationship between growth rates of manufacturing value-added and real exchange rate distortions and variability (as trade policy orientation indicators) combined with the share of average investment in GDP. Also, they utilised some assumptions in their research which say that "the investment rate reflects the availability of capital while outward orientation accelerates efficiency and technological development in each economy. Outward orientation reflects a low level of protection and a stable real exchange rate." Based on their findings, freer trade can stimulate industrialisation in developing nations.

As we have seen, the results of the afore-mentioned studies which have been conducted during the second half of the 20th century by different researchers using a variety of academic methods and utilising different datasets, largely support a meaningful relationship between trade and economic growth and industrialisation. In spite of this, a number of researchers like Krugman (1994), Rodrik (1995) – see Edwards (1998) – and Olofin (2002) have emphasised that the relationship could be obscure, and in some cases the reality could support these doubts.[43]

Table 2.1: Selected research topics which have been investigated to show the relationship between trade and economic growth from 1970 to 1999

Year	***Author (s)***	***Topic***
1970	I. B. Kravis	***Trade*** as a Handmaiden of ***Growth***: Similarities between the 19th and 20th Centuries
1983	D. Salvatore	A Simultaneous Equations Model of ***Trade*** and ***Development*** with Dynamic Policy Simulations
1984	J. Reidel	***Trade*** as an Engine of ***Growth*** in Developing Countries
1987	R. Ram	***Exports*** and Economic ***Growth*** in Developing Countries: Evidence from Time Series and Cross-Sectional Data
1991	D. Salvatore & T. Hatcher	***Exports*** and ***Growth*** with Alternative Trade Strategies
1992	D. Dollar	***Outward-oriented*** developing economies really do ***grow*** more rapidly: Evidence from 95 LDC's, 1976-1985
1988	D. Greenaway & C. H. Nam	***Industrialisation*** and Macroeconomic performance in developing countries under alternative ***trade*** strategies
1995	D.Greenaway & D.Sapsford	***Exports***, ***Growth*** and Liberalization: An Evaluation
1998	S. Edwards	***Openness***, Productivity and ***Growth***: What do we really know?
1998	D. Greenaway *et al.*	***Trade*** reform, Adjustment and ***Growth***: What does the evidence tell us?
1999	J. A. Frankel & D. Romer	Does ***Trade*** Cause ***Growth***?
1999	D. P. Clark *et al.*	***Openness*** and ***industrialization*** in developing countries
* The research topics show that all these studies focused on Trade and Development or Industrialisation.		

[43] For more information see Panitchpakdi (2001)

2.4 WTO membership Impact Investigations

In 1995, while the trade freedom and economic growth casual relationship was still under investigation, WTO came into being to remove trade barriers amongst nations around the world. Since then this organisation and its effect on different economies have attracted substantial interest, and many studies have been conducted on WTO to evaluate the efficiency of its rules and regulations, its structure and so forth. Some of the most important topics and research criteria about the afore-mentioned studies are summarised and presented in Appendix 5. The research topics in this appendix tell us that most researchers have seriously concentrated on the impact of the WTO on the developing world. In other words, the direct and indirect effects of WTO membership on the developing economies have attracted particular attention among researchers and policy makers.

Although, previous researches mostly pointed out the significant potential gains from pursuing WTO-led trade liberalisation for all nations, the effects of WTO membership are unlikely to be uniform around the world. Panitchpakdi (2001:3) remarked that "the demonstrations in Seattle in 1999 showed that there is a high level of public concern over the growth of world trade and the institutions, such as the International Monetary Fund, the World Bank and the WTO, that have key roles in global trade and development. Much of the concern relates to developing countries and their place in the international economy". Developing nations which start the membership process in the WTO usually have to fulfill some preconditions. Doing activities which could support their acceptance process in the WTO not only is time consuming but also is very costly. Moreover, after membership these nations have to accept lots of obligations based on the related rules and

regulations. In fact, the cost of WTO membership for developing nations both before and after the membership is an important factor to persuade researchers and also policy makers to be concerned about the matter, so a group of WTO studies (see Table 2.2) has tried to investigate whether or not there is considerable benefit (or loss) for developing countries as a consequence of being WTO members.[44]

To find a comprehensive answer for this important question some studies have focused on different sectors in these nations. Based on the research topics which we can see in Appendix 5, agriculture, textile, and oil industries are some of these sectors. For example, Lin (2000) studied the effect of China's membership of the WTO on the agriculture sector. China's steel sector has been investigated by Brizendine and Oliver in 2001. Liang studied the effect of entering the WTO on the oil industry and the economy of Taiwan in 2004. Mu Lin in the same year focused on "China's Media Market After WTO Entry". And also, WTO membership and its impact on Russian airline tax was investigated by Barnard in 2006. In fact, there are many more researches which have been conducted to understand how and in what way developing economies have been affected by WTO and its rules, but the features of these studies apparently stimulate thinkers to continue their efforts in this knowledge area.

As the first feature we should say that these researches have largely been conducted before WTO membership, during the transition phase or shortly after the membership date. The effect of trade policy reform takes time to be revealed, especially in developing

[44] WTO rules and regulations not only support trade openness amongst its member-states, but also govern international trade all over the world. It seems that as a result of WTO membership there is more safety for small and weak economies to be integrated in the global trade activities in comparison with non-member nations. These effects could not be separated from each other but can tell us that the overall WTO membership impact is beyond the effect of just trade policy reform.

nations where there are different obstacles which may make such huge changes very difficult and very slow. Therefore, it seems that the main goal of these studies has been to predict the effect rather than to clearly identify the results of WTO membership. Secondly, most of these studies have been done based on descriptive methods to compare economic factors in the nation (or industry) before and after WTO membership. As the third characteristic of these studies we could point out that their analysis has largely focused on the industry level. The results of these type of researches may reveal opportunities or threats for each specific sector in the economy but usually can not prepare related information which is needed to investigate the changes in the industrialisation level after membership of the WTO. Also, based on the research topics in this knowledge area, it will be revealed that most of these studies have been conducted for specific nations. In case of WTO membership impact analyses on the one hand, some countries like China have been the central point of these investigations, on the other hand there are very few studies for some developing nations such as oil exporters. These features tell us there are still many questions about WTO and its impact on the developing world. Indeed, with respect to the importance of the matter, these questions need to be discussed urgently based on what has really happened in WTO member-states.

Any efforts to expand this knowledge area could not only help WTO to assess the efficiency of its rules and regulations to govern trade around the modern world, but also could help its member-nations to improve their ability to utilise WTO rules in order to be more industrialised and developed. In the next section, we explain the mechanism of the change of industrialisation level in development process with regard to technology absorption phenomena. Also, we describe the way which the present study utilises the

export portfolio as an industrialisation index – for the first time – to indicate the impact of WTO membership on the developing economies.

Table 2.2: Selected research topics which have been investigated to show the impacts of WTO membership on developing economies after 1996

Year	*Author (s)*	*Topic*
1996	Y. Yang	China's WTO membership: what's at stake?
1996	J. M. Finger & L. A. Winters	How can the WTO continue to help developing countries to integrate themselves into the international economy?
1996	J. Pietras	The role of the WTO for economies in transition
1999	C. Michalopoulos	The developing countries in the WTO
2000	N. Pain	Openness, growth and development: Trade and investment issues for developing economies
2000	A. Panagariya	E-Commerce, WTO and Developing Countries
2000	R. Sally	Developing Country Trade Policy Reform and the WTO
2001	S. Panitchpakdi	Global Trade Liberalisation: Coordination and Coherence
2001	J. M. Finger	Implementing the Uruguay Round Agreements: Problems for Developing Countries
2003	V. Murinde & C. Ryan	The Implications of WTO and GATS for the Banking Sector in Africa
2003	P. Athukorala & S. Sisira	Food Safety Issues, Trade and WTO Rules: A Developing Country Perspective
2005	A. Mahmood	WTO and Market Access in Non-Agricultural Products: Issues and Options for Developing Countries
* The research topics may seem different but all these studies focused on WTO and its impacts on the growth of developing nations with emphasising on either partial or whole economy analysis.		

2.5 WTO membership and Export Portfolio Analysis

To investigate the impact of WTO membership on the economy of developing nations, we should point out that if development occurs successfully as a consequence of implementing WTO rules and regulations, then we definitely can find some evidence to identify that in the nation's industries. The sign of industrialisation could be in shape of a gradual and sustained change in their production and export pattern from primary products to manufactured goods or in other words from path A to path B (see Figure 1.1

on Page 17). Chenery (1979) who has supported this idea[45] in his research "*Structural Change and Development Policy"* said: "industrialisation rather than growth of per capita output, is the central feature of the transition process from a traditional to a modern developed economy." Measuring the changes in an export portfolio as an industrialisation index could help us to indicate to what extent WTO membership has been successful in a nation.

When investigating the effects of WTO membership on industrialisation, it must be kept in mind that the economies of developing countries are usually dependent on a very narrow range of sectors. A brief review of the export mix in most developing nations indicates that agriculture, textile, apparel and mining sectors have been their main earning sources from international trade for a long time, and history confirms this important fact. For example, Siegfried Schultz (1977:87) investigated developing countries to determine which sector has an important effect on central economic indicators like import dependency, GDP and the balance of foreign trade. In his research "*Approaches to Identifying Key Sectors Empirically by Means of Input-Output Analysis*" he pointed out that the most important part of an export mix in developing nations is related to primary products. As he said "the cross section comparison of balance of trade effects indicates rankings of the primary sectors in the Asian developing countries average highest. More than anything else, this is attributable to exports of mining products such as ores and crude oil and agricultural products. Of the manufacturing sectors, only processed foods have a high ranking". It is apparent that these sectors have played an important role in the economy of developing countries, but if freer trade policies lead to a development in

[45] Quoted in Clark, Sawyer and Sprinkle (1999:161)

these nations then the share of these sectors which could produce and export primary products will decline during the development process. It is important that oil exporting nations or other developing countries who rely on exports of natural resources should consider the negative side effects of capital accumulation as a result of the Dutch Disease. As Hilaire (2004) noted, the "Dutch Disease is an economic phenomenon that affects countries upon the discovery, extraction and exportation of large amounts of natural resources." In fact, a huge increase in income can lead a surplus in the balance of payment and then in a flexible exchange rate system it can lead to the appreciation of the nation's exchange rate, which in turn can cause an economic slow down. The effects of the Dutch Disease on the economy may appear in the shape of a decrease in the production and exports of import-competing commodities and an increase in the imports of these products. These circumstances cause employment to fall in these nations. According to Hilaire, it is vital for developing nations such as oil exporters to know "how to manage the inflow of wealth so as to create industries capable of creating lasting value." The author indicates that the large inflow of temporary revenue should be used to create permanent wealth through focusing on human skills education (Gylfason – 2001 quoted in Hilaire – 2004), to raise the human capital especially as the world moves beyond a goods-based economy and also through a tight monetary policy to control the private spending. It is beyond the scope of the present investigation to focus on this matter in more detail. For more information see Salvatore (2007:579) where the relationship between the adjustments of the balance of payments with exchange rate changes has been discussed.

Economic growth over time, apparently, will change the patterns of trade in the nation as a result of changing factor endowment which, spectacularly, could move it away from the old comparative advantage, and this change could be observed in the nation's leading sectors' production and export.[46] In this regard, a developing country may still continue to produce and export its previous products based on its current comparative advantage, but as Dunn and Mutti (2000) say, after starting and continuing the development process new comparative advantages may exist in its competitive industries and then it will have some new leading sectors with different products which lead to a significant change in the nation's trade patterns. It seems that the production and export pattern of a nation could reflect its level of industrialisation. In other words, they could be two sides of one coin. For example, less developed countries (LDCs) mostly produce and export primary products like agricultural goods but developed nations' products are more complex. According to Mahmood (2005), an investigation of trade-development processes which can occur as a result of different macro linkages between trade liberalisation and growth, reveals a significant change in the export mix of successful nations through specialisation, efficiency, and productivity improvement in their competitive economic sectors.[47] This means that the successful countries in international trade are those who have sectors in a strong world-class competitive position. Also, the effect of trade liberalisation on a sector's performance – which depends on the level of comparative

[46] For more information see, Dunn and Mutti (2000)

[47] As Mahmood (2005) says: "Given linkages between tariff concessions, imports, productivity, exchange rate, exports, and economic growth, there are three underlying channels that link trade liberalization to economic growth:

a) liberalization – productivity – growth
b) liberalization – imports – exports – growth
c) liberalization – exchange rate – growth"

advantage exhibited by each sector – will vary from industry to industry. He believes that "industries with true comparative advantage will expand and those having inherent disadvantage will contract." As a result of these expansions and contractions which may occur in industrial sectors, the overall export mix of these countries will change gradually in different stages of the development process.

Therefore, investigating an export portfolio could not only be helpful to clarify the specific role of different competitive sectors in shaping their nation's production and export mix but also could indicate how they have contributed towards industrialisation goals. In other words, being in a better competitive position in sectors which mainly produce and export primary products (Path A) could not be the ultimate goal in international trade. To be industrialised, developing nations have to utilise their old leading sectors either to produce more non-primary manufactured goods or to produce money to invest in other sectors (Path B) which could be considered as new leading sectors in the future.

Some researchers like Gutierrez de Pineres and Ferrantino (1997) and Stanley and Bunnagi (2001) who studied export diversification and its benefits for economic growth focused on technological innovation as the departure point for industrialisation. The process then could be continued by improvements in production efficiency as a consequence of technology absorption which affects the competitive advantage of various sectors in the economy. According to Taylor (2003), trade liberalisation and its consequent market expansion not only could provide export opportunities and remarkable incentives for production efficiency but also could stimulate the transfer of advanced

technologies.[48] Therefore, based on this demonstrated mechanism it seems that an export portfolio potentially could change in response to the new export opportunities of the economy.

To explain the theoretical foundation of the afore-mentioned mechanism, we focus on two relevant categories of models. As Taylor (2003:105) has pointed out about *new growth theory*, "in early endogenous growth models, technological change occurred through learning-by-doing stimulated through investments in human and physical capital (Romer, 1986; Lucas, 1988; Thompson, 1993)." In the second group models have been explained based on *technology gaps* (e.g. Abramovitz, 1956). Although these models address the convergence-divergence debate in different ways, they similarly focus on two major sets of factors which affect the technological imitation and innovation activities in the developing world. With regard to Taylor (2003), these two sets are namely technological congruence ("which relates to the basic characteristic of technology available for transfer") and social capability (e.g. levels of human capital, economic infrastructure and institutional capacities).

In addition, based on evolutionary economics which have been developed by contributors like Nelson and Winter (1982), Pavitt (1984), Dosi (1988), Dosi *et al.* (1988) and Dosi, Freeman and Fabiani (1994), important aspects of technology are embodied in persons and in institutions,[49] therefore, they are specific to each nation (or firm). To explain technological specialisation[50] this fairly new branch of economics considers three following mechanisms: Firstly, firms or nations compete (the selection mechanism) in a

[48] To see the channels of technology transfer refer to Dalum, Laursen and Villumsen (1996)
[49] Quoted in Dalum, Laursen and Villumsen (1996:3)
[50] As Soete (1981) pointed out "trade specialisation is closely related to technological specialisation at the level of the country." Quoted in Dalum, Laursen and Villumsen (1996:4)

struggle for market share. Secondly, firms or countries compete where they learn (the mechanism of search) and gain or lose depends on their relative (technological) competitiveness. Finally, what firms or nations can do depends on what they have done in the past (transmission mechanism). According to Dalum *et al.* (1996:4) these three points may indicate that the pattern of specialisation in a nation could be stable even in the long-run.[51] Although the change in the export structure of developing nations may be faced with significant barriers, identifying appropriate technology and also overemphasising "picking winners"[52] may help these nations to overcome the obstacles. Also, in the case of technology absorption, as Beelen and Verspagen (1994) have indicated, the technology catching-up process can occur as a result of knowledge spill-overs and structural change which means that a nation must change its production structure to become adapted to absorb the technology spill-overs.

Obviously, the ultimate impact of technology absorption could be revealed in the nation's export portfolio, and this is what we want to utilise for the first time in the related knowledge area to indicate the effects of WTO membership on industrialisation. In other words, in the present research we use export portfolio analysis in order to study the changes in the level of industrialisation (as the initial step towards sustained long-run economic development) which can in turn provide us with a new perspective on the impact of WTO membership. With respect to the important role which export portfolio investigation can play to clarify the changes in the industrialisation level in the developing world, we analyse the export portfolio between the terminal and base time

[51] Lundvall in 1988 described that "vertical innovation linkages (or user-producer relationships) are likely to influence specialisation pattern to be stable, given that such relationships are usually durable." Quoted in Dalum, Laursen and Villumsen (1996:4)

[52] Based on Taylor (2003:105), "the probability of wining is proportional to expenditure on research and development."

periods to indicate the effect of WTO membership in oil exporting nations. To do this, we study their trade pattern differences before and after WTO membership to indicate whether there has been any change in the industrialisation level. We believe that in order to study the trade-industrialisation relations, a more exhaustive analysis of trade statistics should be urgently made regarding to the WTO membership issue of these countries. Moreover, it is apparent that there are some benefits in making a holistic investigation into these nations because the results of these studies not only can identify the business risks in their export portfolio, but also could help them to assess the uncertainty associated with implementing trade liberalisation programmes.

In fact, based on the literature which has been discussed in chapter 2, it can be seen that we still have major gaps in our knowledge about the impact of WTO membership on industrialisation and growth. Whilst previous studies have investigated the effects of trade freedom on different development factors such as GDP, Income, Total Factor Productivity and so forth, no previous study has focused on the impact of WTO membership utilising export portfolio analysis. In previous studies, export portfolio analysis has been utilised to measure export diversification in Latin America and the Caribbean (see Taylor-2003) and to analyse specialisation patterns of OECD countries (see Dalum, Laursen and Villumsen-1996) but these studies have not extended to investigating the impact of WTO membership. Also, in spite of most of the previous researches which focused on specific sectors, we analyse the data for different sectors in the export basket which reflects the changes in the industrialisation level in our selected nations during the period of study. The third characteristic of the present research is to focus on more than just one country at the same time which will help us to compare the

results of membership in different nations with different economic status. And last but not least, we analyse the effect of WTO membership in most of these nations a long period of time after their membership date. This provides more accurate results in comparison with studies which tried to predict the membership impact. Therefore, the key contribution of this study is to measure the impact of WTO membership using a new – and a much more comprehensive – method for the very first time.

2.6 Chapter Summary

In this chapter we explained the background of the trade-development studies to prepare the basic foundation for focusing on the relationship between WTO membership and export portfolio changes. An investigation of export-led growth as the departure point for the literature review indicates why a number of researchers during the second half of the 20^{th} century have concentrated on the issue of trade liberalisation and its relationship with economic growth and industrialisation. Moreover, the chapter focuses on the difficulties which thinkers have faced in defining trade liberalisation proxies and economic development criteria. Section four provides a brief history of different studies which have been conducted by a number of contributors in the area of trade-development and industrialisation. The next section focused on WTO. In 1995 WTO was founded to support trade liberalisation amongst its member-states around the world, while as a consequence of the research difficulties in the knowledge area the relationship between freer trade and growth still was a very important subject of debate. In other words, although in its rules and regulations WTO emphasised trade freedom, its effect on global trade was unknown. Therefore, researchers tried to investigate the impact of WTO membership on different economies. Most of these studies have been conducted on single

nations and in specific sectors so they can not be used to identify the overall effect of membership on the economic development of the investigated nations. Moreover, the potential problem with the limited time interval between the date of the nation's membership of the WTO and the date of the study, especially for research done before 2000, is that not enough time has elapsed for the consequences to be realised.

Based on the mentioned characteristics of these studies and to improve the existing knowledge area, in section five of the literature review we focused on technology transfer and technology absorption as the initial points for the export diversification process to indicate how it could help developing nations to be more industrialised. As we pointed out, export portfolio analysis as an industrialisation indicator focuses on all sectors in the economy. In this regard, it can help us to develop an economic growth symbol to reveal the industrialisation level changes in WTO member-states.

Chapter 3

Research Methodology

Introduction

The methodology and its foundation which were briefly introduced in the research structure and literature review are discussed in this chapter in detail to clarify the way in which we investigate the research questions. This chapter consists of six sections. Paths[53] A and B are discussed in more detail in the first section. In addition, this part describes the change in the degree of trade liberalisation in oil exporters around each WTO membership point. The second part of the chapter focuses on different comparison points which have been used to make the *difference analyses* for the crude oil export ratio (CER) based on with-without and before-after approaches. In section three we demonstrate CER utilising an algebra formulation which provides a solid base to analyse the changes after WTO membership in oil exporting nations. Section four basically focuses on export trade off value (ETOV) measurement and the indicator interpretation. The statistical methodology which is employed in the second phase of this research to show the changes in the export portfolio appears in part five. Finally, in the last section we demonstrate what conclusions we have reached in this chapter.

[53] For more information see Figure 1.1 on page 17

3.1 Towards a Path Finder Methodology

Based on the literature on trade-development relations and the controversies which still continue about the real outcomes for developed and developing nations (see section 2.2), it is important to note that such controversies could not be solved without finding reliable evidence about the meaningful benefits for developing nations in the long-run. Even if there is supposed to be a meaningful positive relationship between trade liberalisation and the growth of GDP, it is important to concentrate on the main cause of economic growth in the developing nations which was found in previous researches. For example, a notable rise in the price of crude petroleum in oil exporting nations may increase the level of GDP in these countries without any real change in the countries' product and export volume. In other words, it is possible to see a rise in GDP in a nation without any meaningful change in its comparative advantage which a developing nation needs to increase its industrialisation level. In fact, a generalisation of the previous research findings is not enough to guarantee sustainable economic development after trade barriers in the developing world are lowered or even removed. Obviously, the benefits of trade liberalisation will not be equally distributed among nations and this is the point that we should investigate more to solve the controversies.

In the present research, we focus on changes in the export portfolio in petroleum exporting countries to find any evidence which indicates a meaningful change in the comparative advantage from primary to non-primary commodities after their membership of the WTO as a very initial step to becoming industrialised and developed in the long-run. Referring to Figure 1.1 on page 17, if developing countries just focus on increasing their openness to being more active in international trade, according to many previous

studies they may develop in the short-run but can not change their comparative advantage automatically. As we said in the first chapter, we call this situation *path **A***. In this path the traditional leading sectors like agriculture or mining will produce more primary products because of their comparative advantage, and this may lead to an increase in the nation's GDP. Indeed, path A – which also may be considered as the preparation phase for path B – could be recognised as follows:

1- There are a limited number of leading sectors in the nation.
2- The leading sectors place more emphasis on producing primary products.
3- Investment mostly leads to an expansion of the leading sectors to produce more primary products.

In this path, a nation has a natural comparative advantage to produce and export primary commodities. In other words, a quick look at the export basket reveals that not only is the CER very high but also the number of top exportable commodities is limited.

But, to be successfully integrated in the global economy and to reap the positive outcomes of freer trade in the long-run these nations have to wilfully manipulate their overall trade and investment policies towards changing their comparative advantage from primary to manufactured goods which could help these nations to be more industrialised, and this is the path which we call *path **B***. In this path, whereas GDP growth rate is supposed to be positive, the CER will show a diminishing trend, and more importantly a gradual rise in the number of competitive sectors will diversify the nation's export portfolio. Finding a relationship between openness and development could not help in this matter without considering and measuring the dependency of the nation on a primary commodity export like crude oil, because developing countries would like to know what

kind of development will occur, and this is what we want to study in this research. To recognise the path that oil exporters have taken after WTO membership, and also to find the related characteristics of each of the above-mentioned paths, we focus on the export pattern in these countries.

To do this we refer to CER and revealed symmetric comparative advantage (RSCA) which have been introduced in the first chapter. But, before analysing these indicators, it is worth stepping back to briefly explain what really happened after the WTO membership point which could affect the export mix in these nations, and to explain this, we refer to one of the main missions of the WTO which is to remove or at least to decrease international trade obstacles to liberalise trade among member-states. In this regard, the WTO rules and regulations place heavy emphasis on decreasing tariffs, non-tariffs and any other form of trade related barriers which could increase the degree of trade openness in these nations after their membership in the organisation. Therefore, based on the meaningful decrease in the average tariff rate (ATR) in most of our sample nations after their membership date, the lowering of trade barriers is one of the actions which is most likely to be considered in member-states as a consequence of their membership of the WTO. Referring to World Bank data[54] about tariff rate changes, for example Cameroon has changed its ATR from 32 percent in 1987 to 18 percent in 2003. For the Republic of Congo this rate also meaningfully changed from 32 percent in 1986 to 18 percent in 2003, and Ecuador has reduced its ATR from 37.7 percent in 1986 to 11.3 percent in 2003. The ATR has been decreased in Egypt from 42.8 in 1986 to 22 percent in 2003, Norway has changed its ATR from 6 percent in 1988 to 2.5 percent in

[54] See siteresources.worldbank.org/ INTRANETTRADE/Resources/tar2002.xls

2003, Nigeria has reduced this rate from 33.7 percent in 1988 to 30.6 percent in 2003, for the United Arab Emirates the rate has changed from 4.5 percent in 1986 to 4.0 percent in 2003, and finally Venezuela has reduced its ATR from 32.9 percent in 1987 to 13 percent in 2003. Although ATR reduction in these nations is noticeable in terms of moving away from a closed to a freer trade strategy, to have a more complete picture of trade freedom in this research we focus on a new openness indicator which has been called Freedom to Trade Internationally (FTI). In the next section we briefly explain the reasons for making a flexible comparison in this study when we use with-without and before-after methods for CER analysis. Then, with respect to the research algorithm (Figure 1.2), and based on CER, and RSCA indicators we analyse the export dependency on crude petroleum and export portfolio in oil exporting nations.

3.2 Comparison Points Flexibility (for CER analysis)

We have mentioned earlier in the literature review, the analytical approaches to investigate trade liberalisation and its impacts on every case include, *with-without*, and *before-after* for cross country and time series data analyses and recently *panel view* for panel data study.[55] Although the first two methods have been used widely in natural sciences in completely controlled experiments, which sometimes may not be affordable in social sciences, as we have seen in the literature they could still be considered as powerful basic approaches to analyse variables' behaviour in most areas such as trade related subjects. In this research we concentrate on these methods which have been used with each other to yield more reliable results.

[55] Greenaway *et al.* (1998)

According to Harrigan and Mosley (1991) the "with-without" method conveniently indicates the differences between what actually happened and what, it is believed, would have happened in the absence of the source of the change (e.g. a new trade or financial policy implementation), with separating out and eliminating the influence of exogenous factors. In order to minimise the effects of the afore-mentioned factors the with-without method considers two groups which are the treatment and control groups.[56] In this case, when the method evaluates two groups of nations, it is called the aggregative with-without approach. Each country in the control group will match with one similar nation in the treatment group based on some important economic factors such as GDP growth rates or GNP per-capita before implementation of the changing programme (e.g. trade reform) in the treatment group. Pairing nations based on the similarities of their economic structure considering the level of industrialisation and the degree of export concentration indicates the way in which the with-without method tries to eliminate the effects of major exogenous factors. Then the method compares two groups based on some evaluation criteria such as GDP or investment growth to analyse any meaningful change in the treatment group. This method which has been used widely in different studies can investigate any differences between two groups, but it is still sensitive to the choice of time period, and because of this, complementary actions, are needed to support the results. One of these activities is to investigate the changes in our sample nations before and after the comparison point. The *Before-after* method, as we said earlier, considers the treatment and control groups with a time dimension to evaluate the results of the changing programme more precisely. These two procedures can be very helpful,

[56] As Harrigan and Mosley have explained, comparison between the *with* and *without* outcomes could be made on a cross-section basis if the study compares a group of countries, or could be on a time-series basis if the study covers just a single nation.

especially in the case of finding any changes in a change analysis study, but to emphasise the robustness of the results these methods still need to be supported by an accurate regression analysis which could offer a clearer picture of the dependent, independent and also exogenous variables relationship in the research area. Such a methodology offers a much more promising avenue to yield reliable results than the existing methods in the case of CER analysis.

In order to do with-without (after matching similar member and non-member nations) and before-after analyses, we need to consider a meaningful comparison point to compare each related block (treatment and control groups in with-without and treatment groups in before-after) with each other, but according to Appendix 1, the date of membership for all WTO member-states in our population is not the same. Therefore, to find a more reliable result, we consider three different comparison points (in three time periods or TP_s) for each comparison case. With respect to the research algorithm, we have the following different comparison cases:

1- CER for WTO members and CER for non-members in with-without (simple and mixed average method)
2- ETOV for WTO members and ETOV for non-members in with-without
3- CER for WTO members in before-after (simple and mixed average method)
4- ETOV for WTO members in before-after

In the first phase of this research, we study the related data to compute CER and – its alternative indicator – ETOV between 1986 and 2003. Table 3.1 indicates t_1 for before and t_2 for the after period for all nations in the population. In the case of full data

availability, t_1 stands for the number of covered years before the WTO membership date which is equal to t_2 (the number of years between membership date and 2003) for WTO members. As an example, for Qatar the date of membership of the WTO is January 1996 so we have 8 years between the membership date and 2003 which means that t_1 and t_2 respectively are 1988-1995 and 1996-2003. Also, t_1 and t_2 is two equal time periods between 1986 and 2003 for WTO non-members. For these nations we normally consider 1995 as the comparison point in the case of full data availability. If data is not available in a specific year in each period in order to have two equal time periods we have to balance them first. For instance, in the case of Iran we do not have the data for 1986, so first of all, we ignore 2003 and then we have two equal 8-year periods. We used t_1 to compute CER_1 which has been utilised to recognise the research population. As we said earlier, nations with a CER_1 of more than 30 percent have been investigated in this research. Then we will do an aggregate analysis based on our data according to the following time periods (TP_S):

a- Considering 1986-1994 as the first period and 1995-2003 as the second. (Based on 1995 as the first comparison point which is supposed to be the start point for WTO governing activities.)

b- Considering 1986-1990 as the first period and 2000-2003 as the second. (Based on 5 years before and after 1995 as the second comparison point to show the lagged effect of WTO membership especially for nations which have been WTO members since 1995.)

c- Considering 1990-1996 as the first period and 1997-2003 as the second. (Based on 1997 as the third comparison point to focus on the changes between two equal time periods.)

Table 3.1: Research samples period of time coverage (1986-2003)

Country	t_1	t_2		*Country*	t_1	t_2
Algeria	**9**	**9**		***Libya***	**7**	**7**
Angola	**7**	**7**		***Nigeria***	**8**	**8**
Brunei	**9**	**9**		***Norway***	**9**	**9**
Cameroon	**8**	**8**		***Oman***	**3**	**3**
Congo (Rep)	**7**	**7**		***Qatar***	**8**	**8**
Ecuador	**8**	**8**		***Saudi Arabia***	**9**	**9**
Egypt	**9**	**9**		***Syria***	**9**	**9**
Gabon	**8**	**8**		***UAE***	**8**	**8**
Iran	**8**	**8**		***Venezuela***	**9**	**9**
kuwait	**9**	**9**		***Yemen***	**5**	**5**

3.3 CER change analysis

We start our investigation with the nation's export measurements of both primary and non-primary commodities referring to our export parameters in the first chapter[57] for year (i), so we could write:

$$XO_i = TE_i - XC_i \tag{3.1}$$

[57] XC = Crude oil exports, (m $), XO = Total non-primary exports (m $), TE = Total annual exports, (fob, m $)

If XC_i and TE_i respectively stand for the value of crude oil and total exports of the nation based on million US Dollars (m $) at current price, in year (i), we can calculate the crude oil export ratio (CER) to get the export mix of the nation as follows:

$$CER_i = \left(XC_i \Big/ TE_i \right) \times 100 \qquad i = 1986,\ldots, 2003 \tag{3.2}$$

Based on this index which has been computed for year (i), it is possible to analyse export mix differences between two different years (e.g. i and $i+1$) for each sample nation. Suppose θ and λ respectively stand for the value of change in primary and non-primary exports between year (i) and $(i+1)$, then each nation has three possibilities for each commodity to change its export mix. For instance, as shown below, the amount of θ (crude oil exports change) could be positive, negative or even zero, based on the value of XC_i and XC_{i+1}:

$$\Delta XC = XC_{i+1} - XC_i = \theta \tag{3.3}$$

$\theta > 0$ when $XC_{i+1} > XC_i$

$\theta = 0$ when $XC_{i+1} = XC_i$

$\theta < 0$ when $XC_{i+1} < XC_i$

Also similarly for λ (the change in the exports of non-primary products between year i and $i+1$) we have three different possibilities as follows:

$$\Delta XO = XO_{i+1} - XO_i = \lambda \tag{3.4}$$

$\lambda > 0$ when $XO_{i+1} > XO_i$

$$\lambda = 0 \text{ when } XO_{i+1} = XO_i$$

$$\lambda < 0 \text{ when } XO_{i+1} < XO_i$$

Besides the previously mentioned change possibilities of these two variables, they have the following relationship with each other when we consider their absolute value:

$$|\lambda| > |\theta|$$

$$|\lambda| = |\theta|$$

$$|\lambda| < |\theta|$$

Therefore, based on the possibilities and the above relations which may lead to a meaningful change in the export mix of the nation, we calculate the number of all possible situations (see Table 3.2) to indicate any change in the nation's exporting behaviour between year (i) and $(i+1)$, as follows:

[***3*** (for θ) × ***3*** (for λ) × ***3*** (for their relations)] – [***4*** (when θ is 0) + ***4*** (when λ is 0) + ***2*** (when $\theta = \lambda = 0$)] =

27 – 10 = 17

There are two important points which should be explained about Table 3.2 as follows:

1- It is theoretically possible to see a scenario with no change in θ and λ when: $\theta = 0, \lambda = 0, |\lambda| = |\theta|$

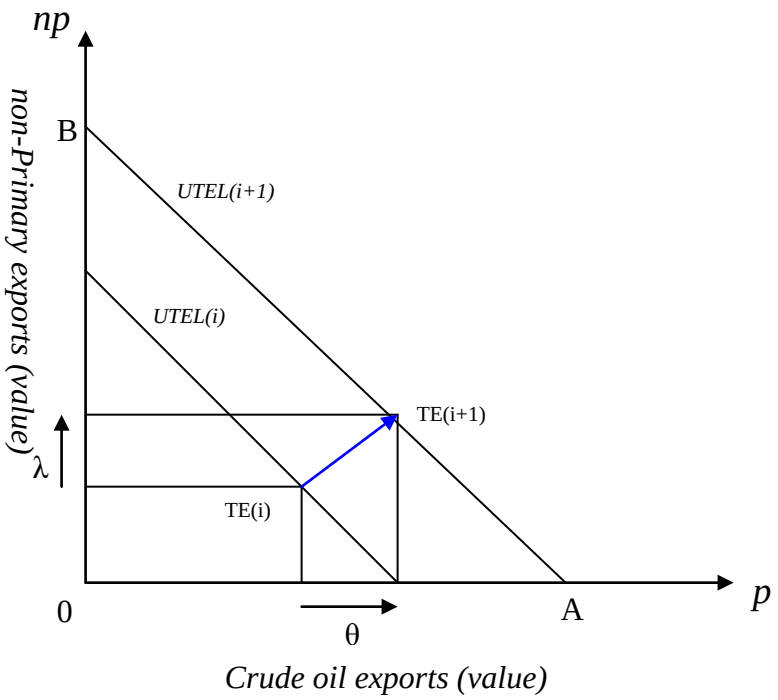
2- Although, these relations show any possible combination of θ and λ, they do not predict the related impacts on CER. To do this, we need more information about XC_i and XO_i. In the rest of this section, we develop a mathematical basis which leads us to these relationships.

Table 3.2: Possible scenarios for θ and λ change combinations

Scenario	Characteristics		Scenario	Characteristics
A	$\theta>0, \lambda>0, \lvert\lambda\rvert > \lvert\theta\rvert$		**I**	$\theta>0, \lambda<0, \lvert\lambda\rvert = \lvert\theta\rvert$
B	$\theta=0, \lambda>0, \lvert\lambda\rvert > \lvert\theta\rvert$		**J**	$\theta<0, \lambda>0, \lvert\lambda\rvert < \lvert\theta\rvert$
C	$\theta<0, \lambda>0, \lvert\lambda\rvert > \lvert\theta\rvert$		**K**	$\theta<0, \lambda=0, \lvert\lambda\rvert < \lvert\theta\rvert$
D	$\theta>0, \lambda>0, \lvert\lambda\rvert = \lvert\theta\rvert$		**L**	$\theta<0, \lambda<0, \lvert\lambda\rvert < \lvert\theta\rvert$
E	$\theta>0, \lambda>0, \lvert\lambda\rvert < \lvert\theta\rvert$		**M**	$\theta<0, \lambda<0, \lvert\lambda\rvert = \lvert\theta\rvert$
F	$\theta>0, \lambda=0, \lvert\lambda\rvert < \lvert\theta\rvert$		**N**	$\theta<0, \lambda<0, \lvert\lambda\rvert > \lvert\theta\rvert$
G	$\theta>0, \lambda<0, \lvert\lambda\rvert < \lvert\theta\rvert$		**O**	$\theta=0, \lambda<0, \lvert\lambda\rvert > \lvert\theta\rvert$
H	$\theta<0, \lambda>0, \lvert\lambda\rvert = \lvert\theta\rvert$		**P**	$\theta>0, \lambda<0, \lvert\lambda\rvert > \lvert\theta\rvert$

Table 3.2 and its related explanations show all possible behavioural scenarios. This table just classifies different events and does not compare them in terms of any mathematically meaningful differences of comparative advantage change towards non-primary commodities. To do this, with regard to the basic assumption of the present research which assumes that all products in the nation could be categorised into two groups consisting of crude oil or primary (*p)* and non-primary (*np*) commodities, we utilise a Cartesian coordinate plane with the relative value of these products on the horizontal and vertical axes respectively to show how the uniform total export line (UTEL) could shift as a result of θ and λ changes (Figure 3.1). The graph just indicates scenario *E* from different scenarios which we mentioned in Table 3.2, so it can vary considerably from nation to nation depending on θ and λ changes between year (i) and $(i+1)$.

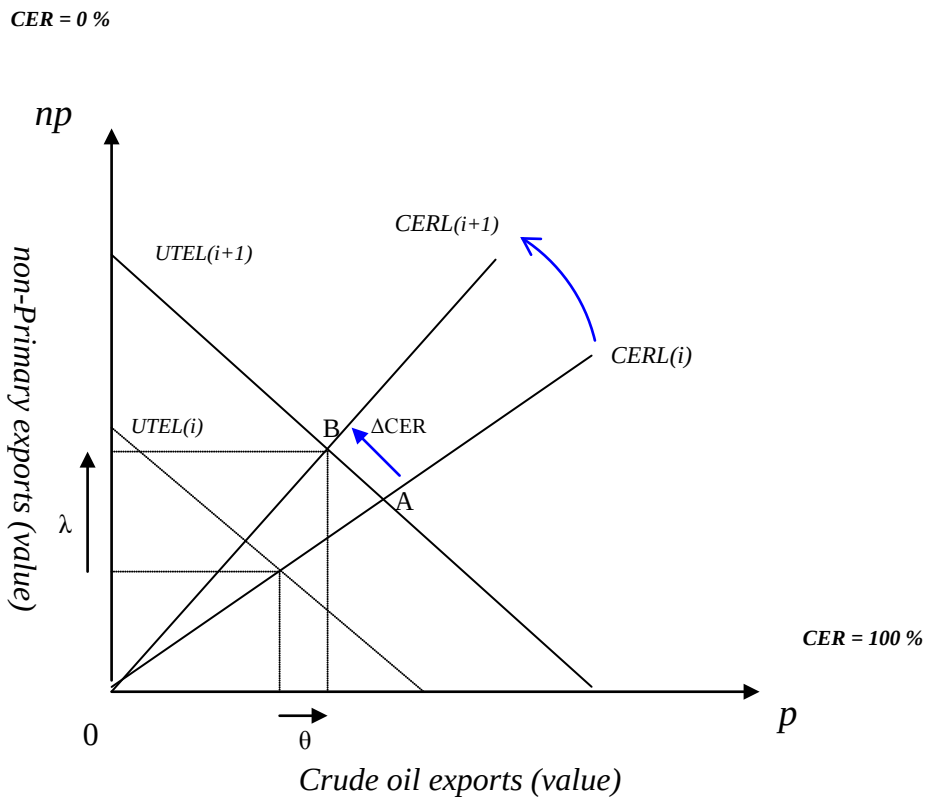
Figure 3.1: The shift of UTEL as a result of θ and λ changes



The uniform total export line (UTEL) is drawn by plotting the points whose coordinates' addition ($p+np$) are equal, so, where this line intersects the horizontal axis (point A) the nation just exports crude oil and where this graph intersects the vertical axis (point B) the value of crude oil exports would be zero.

In addition, as Figure 3.2 shows, the crude oil export ratio line (CERL) which is drawn by plotting the points, whose related CER amounts are equal, can rotate as a result of θ and λ changes and every CERL always passes through the origin of the rectangular coordinate system. Based on this figure, when CER is equal to zero, CERL coincides on the vertical line of the plane which means that the nation can change all produced crude oil to non-primary products, and when CER is equal to 100, CERL would be horizontal which means that the nation just exports crude oil.

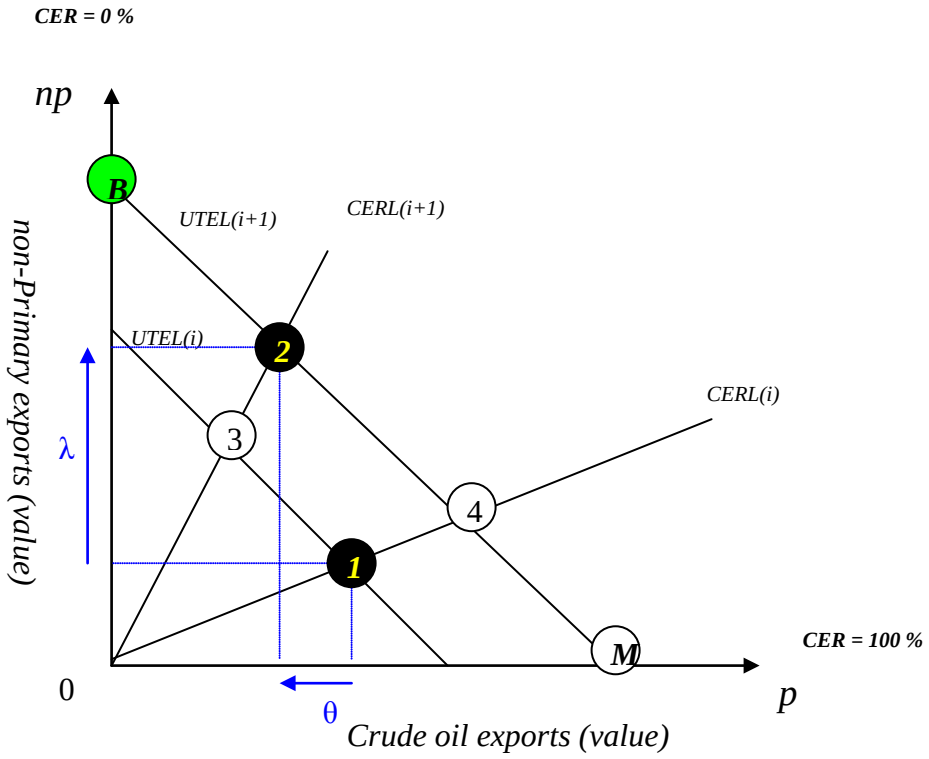
Figure 3.2: CERL rotates as a result of θ and λ changes



Although TE is equal at any point on each UTEL the share of non-primary commodities exports in TE depends on the point where CERL intercepts the UTEL. For example, at point A in Figure 3.2, the share of non-primary exports in TE is less than point B, so a negative ΔCER shows that the nation's effort to increase the share of the exports of non-primary commodities was effective. Based on the noted simultaneous effects of θ and λ changes on UTEL and CERL between year (i) and $(i+1)$, a nation's new point, for example, point 2 in Figure 3.3 – which indicates both TE and CER changes at the same time – could be anywhere in the triangle (OBM), but here the question is: which point could show us the biggest possible change in the nation's comparative advantage from primary to non-primary products between year (i) and $(i+1)$?

Figure 3.3: Two Dimension Trade off Model

(CERL rotation, UTEL shift and the Target point)



Referring to the figure, we can recognise a point with maximum possible TE and a CER equal to zero (point B in the Figure 3.3) where the nation could increase its TE and at the same time it could absorb all crude oil in order to export the highest amount of non-primary products. We call this point the target point, which in this model works as an efficient criterion to precisely compute the value of the activities which have been carried out in each sample country between two specific years (i) and $(i+1)$ to change the comparative advantage.

Now, with regard to this target point, it is possible to measure CER differences between each two points of the system (e.g., point 1 and 2 in Figure 3.3) so we have:

$$\Delta CER = CER_{i+1} - CER_i \tag{3.5}$$

It is helpful to rewrite equation (3.5) based on θ and λ as:

$$\Delta CER = \left(\frac{XC_i + \theta}{XC_i + \theta + XO_i + \lambda} - \frac{XC_i}{XC_i + XO_i} \right) \times 100$$

Combining two fractions together yields:

$$\Delta CER = \left[\frac{(XC_i + \theta)(XC_i + XO_i) - (\theta + \lambda + XC_i + XO_i)XC_i}{(\theta + \lambda + XC_i + XO_i)(XC_i + XO_i)} \right] \times 100$$

and after calculating the above fraction, we get:

$$\Delta CER = \left[\frac{\theta(XO_i) - \lambda(XC_i)}{(TE_i)(\theta + \lambda + TE_i)} \right] \times 100 \tag{3.6}$$

Furthermore, we could show the growth of total exports (GTE) as:

$$GTE = \left(\frac{TE_{i+1} - TE_i}{TE_i} \right) \times 100 = \left(\Delta TE \Big/ TE_i \right) \times 100 \tag{3.7}$$

Substituting θ and λ in numerator of this fraction yields:

$$GTE = \left(\frac{\theta + \lambda}{TE_i} \right) \times 100 \tag{3.8}$$

If $GTE \neq 0$ we could change the above fraction as follow:

$$TE_i = \left(\frac{\theta + \lambda}{GTE}\right) \times 100 \tag{3.9}$$

Finally, combining equation (3.6) and (3.9) gives:

$$\Delta CER = \frac{\theta(XO_i) - \lambda(XC_i)}{(\theta + \lambda)^2\left(\frac{GTE + 100}{GTE^2}\right)} \tag{3.10}$$

To simplify things slightly, let's explain some important behaviours of ΔCER and its relationship with GTE based on equation (3.10):

If $TE_{i+1} \rangle 0$ the denominator of ΔCER is always bigger than zero.

Then ΔCER is equal to 0 if:

$$\theta(XO_i) - \lambda(XC_i) = 0$$

$$\theta(XO_i) = \lambda(XC_i) \tag{3.11}$$

so we could say ΔCER = 0 where: $\frac{\theta}{\lambda} = \frac{XC_i}{XO_i}$

in this case if $\theta \neq -\lambda$ just GTE will change and export mix remained constant.

Similarly ΔCER is less than zero when:

$$\frac{\theta}{\lambda} \langle \frac{XC_i}{XO_i}$$

and ΔCER is bigger than zero when:

$$\frac{\theta}{\lambda} \rangle \frac{XC_i}{XO_i}$$

Also when GTE is equal to zero ($\theta = -\lambda$), ΔCER could be calculated as follows:

$$\Delta CER = \theta / TE_i \times 100 = -\lambda / TE_i \times 100 \qquad (3.12)$$

As a result of these computations we realise that to reach the target point nations should try to increase TE and decrease CER as much as they can, and this export mix improvement directly depends on how they change θ and λ. According to Figure 3.3, to achieve the target point oil exporting nations should change θ and λ in order to shift UTEL up and right and at the same time decrease CER. If points 1 and 2 represent the export mix in the year (i) and $(i+1)$, to move from point 1 to point 2, we have two different paths (towards points 3 or 4).[58] Indeed, if in the above system we consider the rectangular coordinates of these four points, we have:

Point 1: (p_1, np_1), Point 2: (p_2, np_2),

Point 3: (p_3, np_3), Point 4: (p_4, np_4)

Now, based on the above information about these points, we can calculate the differences between points 1 and 2 through drawing the *trade off table* which could systematically tell us how these nations tried to exchange non-primary products with primary commodities, and to do this, first of all we start from point 2 and we concentrate on the line between point 2 and point 4. The TE in both points are equal because they are on the same UTEL; but as the figure indicates, their rectangular coordinates, and consequently the related CER of these points, is different because they are on two separate CERLs. Therefore, at this stage we can compute the effects of CER change on the export mix of the nation in terms of the change in the coordinates between these two points and summarise the results in the following table:

[58] These points are not real and we just utilise them to solve the model.

Table 3.3: Export Trade off Table (CER effects)

Total Exports	***Point 2***	***Point 4***	**ΔCER = CER2 – CER1**
np	np_2	np_4	$np_2 - np_4$
p	p_2	p_4	$p_2 - p_4$
np + p	$np_2 + p_2$	$np_4 + p_4$	0

As we mentioned earlier TE in points 2 and 4 are equal, so we could write:

$$\text{TE in point 2} = \text{TE in point 4}$$

$$np_2 + p_2 = np_4 + p_4$$

Also, according to the table we have:

$$\Delta p = p_2 - p_4$$

$$\Delta np = np_2 - np_4$$

If we re-write the above TE equation based on Δp and Δnp we could say:

$$p_2 - p_4 = -np_2 + np_4$$

$$p_2 - p_4 = -(np_2 - np_4)$$

So we have:

$$\Delta p = -(\Delta np) \tag{3.13}$$

Equation (3.13) indicates how much crude oil these nations ignored in order to export non-primary products or *vice versa* in order to change their CER which represents the export mix in the nation. In other words, it could tell us how much they had to trade off between these two commodities in terms of US dollars at current price. Furthermore, we can see there is no change in TE from point 2 to point 4 because for point 4 we can write:

$$\Delta TE = (np_2 - np_4) + (p_2 - p_4) = \Delta np + \Delta p = \Delta np + [-(\Delta np)] = \Delta np - \Delta np = 0$$

Then to complete our investigation, we continue to study the related differences between point 4 and point 1 which are on the same CERL with different TE. Based on the related rectangular coordinates for these two points we can compute the export effects of the activities which have been carried out in the nation as follows:

$$\Delta TE = (np_4 + p_4) - (np_1 + p_1)$$

Table 3.4: Export Trade off Table (export effects)

Trade off Table	***Point 1***	***Point 4***	**ΔTE = TE2 – TE1**
np	np_1	np_4	$np_4 - np_1$
p	p_1	p_4	$p_4 - p_1$
np + p	$np_1 + p_1$	$np_4 + p_4$	$(np_4 + p_4) - (np_1 + p_1)$

Therefore, the total differences between point 1 and point 2 as a result of changing θ and λ can be yielded by combining Tables (3.3) and (3.4) in the following table:

Table 3.5: Export Trade off Table (total effects)

	Point 1	**CER effects**	**TE effects**	***Point 2***
np	np_1	**λ**		np_2
		$np_2 - np_4$	$np_4 - np_1$	
p	p_1	**θ**		p_2
		$p_2 - p_4$	$p_4 - p_1$	
np + p	$np_1 + p_1$	0	$(np_4 + p_4) - (np_1 + p_1)$	$np_2 + p_2$

Now, based on this table we can calculate the following important export indicators:

$$\theta = (p_2 - p_4) + (p_4 - p_1) = p_2 - p_1 \qquad (3.14)$$

$$\lambda = (np_2 - np_4) + (np_4 - np_1) = np_2 - np_1 \qquad (3.15)$$

$$\textbf{\textit{Export Trade off}}\ (ETO) = (np_2 - np_4) = -(p_2 - p_4) \qquad (3.16)$$

Also we can utilise the following formulas to compute the value of export trade off (ETOV) to indicate the effects of these nations' activities on their export mix in four

different conditions. When ETO is negative the formula shows the amount of the non-primary value which decreases (numerator) as the percentage of non-primary commodity value if the CER would be stable (value of *np4* in Figure 3.3):

1) If $np_2 < np_4 \longrightarrow -np_4 < ETO < 0$

In this situation the value can be calculated by:

$$ETOV = \left(\frac{np_2 - np_4}{np_4} \right) \times 100 \tag{3.17}$$

$$\Rightarrow \quad ETOV < 0, \Delta\, CER > 0$$

2) If $np_2 = 0 \longrightarrow ETO = -np_4$

$$\Rightarrow \; ETOV = -100, \; CER_2 = 100$$

If ETO is positive the formula shows the amount of primary value decrease (numerator) as the percentage of primary commodity value if CER would be stable (value of *p4* in Figure 3.3).

3) If $P_2 < P_4 \longrightarrow 0 < ETO < P_4$

and we have:

$$\oplus ETOV = \left(\frac{-(P_2 - P_4)}{P_4} \right) \times 100 \tag{3.18}$$

$$\Rightarrow \; ETOV > 0, \Delta\, CER < 0$$

4) If $P_2 = 0 \longrightarrow ETO = P_4$

$$\Rightarrow ETOV = 100,\ CER_2 = 0$$

The following table summarises the relationship among these variables:

Table 3.6: Relationship among CER, ETO and ETOV

If np2 = 0 → ETO = -np4 → ETOV = -100 , CER2 = 100
If np2 < np4 → -np4 < ETO < 0 → -100 < ETOV < 0 , ΔCER > 0
If np2 = np4 or p2 = p4 → ETO = 0 → ETOV = 0 , ΔCER = 0
If p2 < p4 → 0 < ETO < p4 → 0 < ETOV < 100 , ΔCER < 0
If p2 = 0 → ETO = p4 → ETOV = 100 , CER2 = 0

3.4 ETOV change analysis

As we said earlier, the CER indicator comfortably indicates the dependency of the economy of oil exporting nations' on crude oil exports, but it can not tell us how this dependency has changed between S_1 and S_2.[59] To concentrate on this issue in more detail we utilise the export trade off value (ETOV) factor which shows the *oil versus non-oil* trade off in these nations from 1986 to 2003. Generally speaking "a trade off usually refers to losing one quality or aspect of something in return for gaining another quality or aspect. It implies a decision to be made with full comprehension of both the upside and downside of a particular choice."[60]

More specifically, here we study ETOV to find out about oil exporters' choices which are made to accept less exports of crude oil (XC) in order to export more non-crude oil commodities (XO) or *vice versa*. Indeed, comparing two *before* and *after* situations for each nation in this research can reveal how these countries have decided to change the

[59] S_1 and S_2 respectively refer to the before and after comparison points.

[60] Retrieved from "http://en.wikipedia.org/wiki/Trade-off"

CER to be more active in the international trade system. To start the ETOV analyses, it is important to concentrate on the matter of ETOV interpretation. In other words, here the question is: what particularly does the result of the ETOV computation mean? With regard to equations 3.17 and 3.18, we demonstrate the exact meaning of positive and negative ETOV as follows:

1- When ETOV is positive the number shows to what extent a nation has successfully reduced its CER between S_1 and S_2 (see point 4 on $CERL_i$ in Figure 3.3).

To explain the above sentence in more detail, assume for example, that the following data indicates average crude oil, non-crude oil and total exports in S_1 and S_2.

$$XC_1 = 80,\ XO_1 = 20,\ TE_1 = 100$$

$$XC_2 = 90,\ XO_2 = 30,\ TE_2 = 120$$

In order to calculate ETOV based on this data first of all we compute CER for the first period, and to do this we write:

$$CER_1 = {XC_1}/{TE_1} \times 100 = {80}/{100} \times 100 = 80\%$$

Now, assume that CER_1 is equal to CER_2, so we calculate the supposed crude oil exports (sXC_2) in the second period as follows:

$$sXC_2 = CER_1 \times TE_2 = 0.8 \times 120 = 96$$

Therefore, utilising equation 3.16 we show the export trade off (ETO) which occurred between S_1 and S_2 is:

$$ETO = -(P_2 - P_4) = -(XC_2 - sXC_2) = -(90 - 96) = 6$$

Indeed, sXC_2 represents P_4 in Figure 3.3.

Finally, with regard to equation 3.18 we have:

$$ETOV = {ETO}/{P_4} \times 100 = {ETO}/{sXC_2} \times 100 = {6}/{96} \times 100 = 6.25\,\%$$

This number indicates that the nation has successfully decreased 6.25 percent of supposed crude oil exports (96 units[61]) in S_2, which means that instead of 96 units it has only exported 90 units of crude oil in the second period. In fact, the 6 units of exports which have been transferred from crude oil (XC) to non- crude oil (XO) commodity have decreased CER between S_1 and S_2.

2- When ETOV has a negative sign it means that the CER has increased between S_1 and S_2 in the nation (see point 4 on $CERL_i$ in Figure 3.3).

We can demonstrate the above sentence in more detail utilising an example. Assume that the following data shows average crude oil, non-crude oil and total exports in S_1 and S_2.

$$XC_1 = 80,\ XO_1 = 20,\ TE_1 = 100$$

$$XC_2 = 115,\ XO_2 = 25,\ TE_2 = 140$$

According to the ETOV calculation procedure, we compute CER for the first period as follows:

$$CER_1 = {XC_1}/{TE_1} \times 100 = {80}/{100} \times 100 = 80\%$$

Then let us say that $CER_1 = CER_2$. Based on this later assumption, we calculate the supposed non-primary or non-oil exports (sXO_2) which gives:

[61] In the present research *Unit* represents the exports of each commodity in volume.

$$sXC_2 = CER_1 \times TE_2 = 0.8 \times 140 = 112$$

$$sXO_2 = TE_2 - sXC_2 = 140 - 112 = 28$$

With respect to equation 3.16 we compute ETO between S_1 and S_2, and obtain

$$ETO = nP_2 - nP_4 = XO_2 - sXO_2 = 25 - 28 = -3$$

In the above relation sXO_2 is equivalent to nP_4 in Figure 3.3.

Here, we should explain that ETO could even be calculated by utilising sXC_2 as well as sXO_2:

$$sXC_2 = CER_1 \times TE_2 = 0.8 \times 140 = 112$$

$$ETO = -(P_2 - P_4) = -(XC_2 - sXC_2) = -(115 - 112) = -3$$

Finally, according to equation 3.17 we obtain ETOV as follows:

$$ETOV = {ETO}/{nP_4} \times 100 = {ETO}/{sXO_2} \times 100 = {-3}/{28} \times 100 = -10.71\%$$

In brief, the result of the ETOV calculation here means that instead of 28 units the nation has only got 25 units from non-crude oil exports in S_2 and the 3 units of exports which have been transferred from non-crude oil (XO) to crude oil (XC) commodity has increased CER between S_1 and S_2.

Obviously, as we have seen in the above equations, ETO could be calculated in two different ways by utilising both P_4 or nP_4 (See equation 3.16). But, the ETOV computation depends on the sign of ETO. If ETO is negative, ETOV should be calculated by equation 3.17 and if it is positive, ETOV will be computed by equation 3.18. These different equations for the ETOV calculation directly relate to its definition which attributes (+100) as the best and (-100) as the worst amounts to this factor. Indeed, when

ETO is positive at best it could be equal to P_4, which may occur in the case of $CER_2 = 0$. On the other hand, when ETO is negative, at worst it could be equal to nP_4; in this case the decline in the non-crude oil exports (XO) could be considered as the main calculation criteria. In sum, ETOV can help us to know more about the behaviour of oil exporters because sometimes we may find equal ΔCER for two or more nations at the same time with totally different ETOV.

As we mentioned earlier in this chapter, a yearly investigation into the change of CER based on the 'with-without' method may help us to find some meaningful differences between the members and non-members of the WTO. Also, with respect to "before-after" analyses we may realise that CER can significantly change before and after WTO membership. But, one last question still remains unanswered in order to complete our debates in the present methodology in the case of CER. Whenever we study the changes in some different phenomena such as WTO membership and export mix (CER) which can occur simultaneously, we should technically investigate whether or not they are statistically correlated. Indeed, there are other factors, like crude oil production or price, in the environment which could potentially affect their relationship unless we find a meaningful correlation coefficient between the phenomena. We study these effects in chapter 5, where we use WTO membership as a dummy regressor to find the relationship between the dummy and total exports (TE) or crude oil exports (XC).

3.5 RSCA change analysis

As we mentioned in the first chapter in order to study the export diversification in oil exporting nations we utilise the revealed symmetric comparative advantage (RSCA) index[62] which can be computed based on Balassa's (1965) RCA as follows:

$$RSCA_{ij} = (RCA_{ij} - 1)/(RCA_{ij} + 1)$$

In this equation,[63] which is suggested by Laursen to adjust the RCA index, we have:

i – for each industry

j – for each country

$0 \langle RCA \langle +\infty$

$-1 \langle RSCA \langle +1$

To investigate the change in export structure based on RSCA analysis, we also utilise the following Galtonian linear regression:

$$RSCA_{ij,t1} = \alpha_j + \beta_j RSCA_{ij,t0} + \varepsilon_i$$

In this model t_1 and t_0 respectively denote terminal and base time periods.

As Taylor (2003:108) says, the "regression is used to compare the distribution of the RSCA for each country at two points in time." [64] But, in what way can this regression help us to know about the diversification of a country's export portfolio? In other words, how can we interpret the findings? Before we start talking about interpretation criteria,

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[62] The methodology has been developed "in a very interesting set of papers produced at Danish Research Unit for Industrial Dynamics." (Taylor, 2003:107)

[63] The equation has yielded with respect to Laursen's suggestion because, based on the RCA definition, its value 'for any industry is constrained to lie between 0 and positive infinity. The inherent skewness of this measure casts doubt on the normality of its distribution.' (Taylor 2003:108)

[64] "The methodology has been used extensively in the examination of structural change in exports (Dalum and Villumsen, 1996; Dalum, Laursen and Villumsen 1996), technology (Cantwell, 1989; Archibugi, 1994) and intergenerational incomes (Naga, 2000)." (Taylor, 2003:109)

we should describe the pattern of export specialisation and the rankings of industries as two elements of diversification which respectively can be assessed based on β (the coefficient of $RSCA_{ij,0}$) and R^2 (the coefficient of determination). The first element shows the range of products in the entire export portfolio, while the second indicates the change in the rank of products in the export basket.

With regard to Cantwell (1989) which graphically illustrated the regression, if there is no change in the relative pattern of export specialisation or in the rankings of the exportable commodities in a country the value of β in the regression will be equal to one. In the following scenarios, we explain the related interpretation of the regression factors considering both β and R.

1- When $\beta < 0$ products with $RSCA > 0$ in the base time will have $RSCA < 0$ in the terminal period and *vice versa* which means that there is a reversal in the pattern of specialisation in the nation.

2- When $\beta = 0$ could not be rejected, especially in combination with the low values of R, it means that the export pattern between the terminal and base time periods has changed randomly.

3- When $0 < \beta < 1$ it means that the country exports products with $RSCA > 0$ less than base time. Also, the export of commodities with $RSCA < 0$ will increase.

In this case, we should consider the regression and mobility effects which respectively could be computed by $(1-\beta)$ and $(1-R)$.

If the values of R and β are noticeably close to 1 it means that the regression and mobility effects are ignorable. Therefore, we can say that there is no change in the

export pattern or the rankings of products in the export portfolio. In contrast, if these mentioned effects are considerable (e.g. when R and β are close to zero) we have:

$$\frac{|\beta|}{|R|} \rangle 1$$

which means the export portfolio is diversified between two time periods.

4- When $\beta = 1$ can not be rejected, especially in combination with the high values of R, we can say that the export pattern between the terminal and base time periods has been very stable.

5- When we have: $\beta \rangle 1$ it means that the country exports products with $RSCA \rangle 0$ more than base time. Also, it reduces the export of commodities with $RSCA \langle 0$. In a case like this if we have: $R \langle 1$ or $R^2 \langle 1$ we could say:

$$\frac{|\beta|}{|R|} \rangle 1$$

which means that a specialisation pattern of exports with a decrease in the range of exportable commodities may have happened.

The time dimension to analyse RSCA changes in chapter 6, for the base time includes 1988, 1989 and 1990 (four years before 1995) and also for the terminal time period includes 2000, 2001 and 2002 (four years after 1995).

3.6 Chapter Summary

In this chapter we focused on paths A and B to realise their differences more deeply which can help us to know what international trade strategy oil exporting nations used after their membership of the WTO. Then, to find the path which they chose, we

developed a two-phase methodology. In the first phase, we study the export dependency on crude oil to systematically analyse the changes of CER and ETOV – as an alternative control factor for CER – before and after the WTO membership point. Also, in the second phase, we expanded our investigations based on export diversification analysis methodology with emphasis on the changes in export specialisation pattern and products rankings in the export portfolio in each single nation. Utilising such a methodology can not only focus on the role of crude oil exports in these economies as a strategic commodity – which may play a positive or negative role in their industrialisation process – but can also help us to have a clear picture from activities in other sectors with an emphasis on what these industries have done to integrate these economies in the international trading system.

Chapter 4

Oil Exporting Nations' Data Profile

Introduction

This chapter describes data which will be used to analyse the export portfolio in the present research. The chapter consists of three sections. The first section focuses on the different variables. This section consists of three parts which respectively present independent, supportive and dependent factors with special focus on crude oil production and price as the main traditional independent variables which represent the dominant comparative advantage of the oil exporting nations. In section two, we explain the alternative datasets which have been used in the study besides the main data source – the United Nations Conference on Trade and Development (UNCTAD) – when it does not contain the data for some nations which we need in the study. This part also includes related complementary information about the reasons which persuade us to use more than one source. Finally, the last section presents a summary of the chapter.

4.1 Research Indicators

The type and the range of the data that we need to consider for examining the crude oil export ratio (CER) and revealed symmetric comparative advantage (RSCA) for the present research, firstly depends on the population of this study which, based on Table 1.1 (page 20-21), consists of 20 oil exporting nations with more than 30 percent economic dependency upon crude oil exports. Moreover, the research questions and the related methodology tell us what kind of data we need to gather in order to carry out a rational investigation of the research questions. Considering these above-mentioned determinants we study and analyse related data in three different groups of variables including independent, supportive and dependent factors. In the following sections we explain both the groups of variables and the way in which we gathered data from the related sources for each category.

4.1.1 Traditional independent variables

Traditional variables are those which directly relate to the crude petroleum and oil industry. These factors normally reflect the dominant comparative advantage of oil exporting countries because they not only influence annual crude oil exports (XC) but also directly have considerable effects on the nation's total exports (TE) especially in nations with a high export dependency on crude petroleum. To investigate the dependency of *TE* in these countries on crude oil exports, it would be helpful to concentrate on some basic stimulators such as the petroleum production level (*Pro*) which itself depends on the amount of national oil reserves and also the level of technology on the one hand and the price of crude petroleum (*Pri*) which stimulates more exports of this commodity on the other hand. We call these factors *traditional variables*

because they have been the main sources of international trade in oil exporters for a long time before their membership in the WTO. Appendix 6 shows some tables and graphs which indicate a meaningful bi-variate relationship between crude petroleum production and price as independent variables with *XC* or *TE* as dependent variables. As a consequence, it is expected to see these factors as independent variables in a regression model to indicate either *XC* or *TE* level for most oil exporters. Also, based on this regression model it is possible to study the effects of WTO membership as a dummy regressor on *XC* and *TE*.

Table 4.1: Free market prices and price indices of Crude petroleum (Annual 1986-2003)

Oil: Spot crude prices				**Crude petroleum, average of Dubai/Brent/Texas equally weighted**	
	Dubai	**Brent**	**West Texas Intermediate**		
US dollars per barrel	$/bbl *	$/bbl +	$/bbl ++	$/bbl **	Year2000=100***
Column No.	*1*	*2*	*3*	*4*	*5*
1986	13.10	14.32	15.04	14.15	48.98333
1987	16.95	18.33	19.19	18.16	63.06667
1988	13.22	14.92	15.97	14.70	50.14167
1989	15.64	18.23	19.68	17.85	60.86667
1990	20.38	23.73	24.50	22.87	78.10833
1991	16.63	20.00	21.54	19.39	64.76667
1992	17.16	19.32	20.57	19.02	64.54167
1993	14.95	16.97	18.45	16.79	57.15833
1994	14.74	15.82	17.21	15.92	54.8
1995	16.10	17.02	18.42	17.18	59.91667
1996	18.52	20.67	22.16	20.45	72.34167
1997	18.23	19.09	20.61	19.31	67.98333
1998	12.21	12.72	14.39	13.11	46.34167
1999	17.25	17.97	19.31	18.18	64.26667
2000	26.20	28.50	30.37	28.36	100
2001	22.81	24.44	25.93	24.39	86.69167
2002	23.74	25.02	26.16	24.97	88.4
2003	26.78	28.83	31.07	28.89	102.4

\+ 1986 -2003 Brent dated
++ 1986 -2003 Spot WTI (Cushing) prices
* 1986 -2003 Dubai dated
** Authors calculation
*** PRICE INDICES 2000=100
Columns 1-3 are derived from BP Statistical Review of World Energy June 2004 (Price 1986-2003)
Column 4 shows authors computations
Column 5 is derived from UNCTAD Handbook of Statistics 2005 (Price Indices 1986-2003)

In other words, here the question is whether or not WTO membership has been an effective regressor for *XC* or *TE* while two very powerful traditional factors still seem to be active in oil exporting nations.

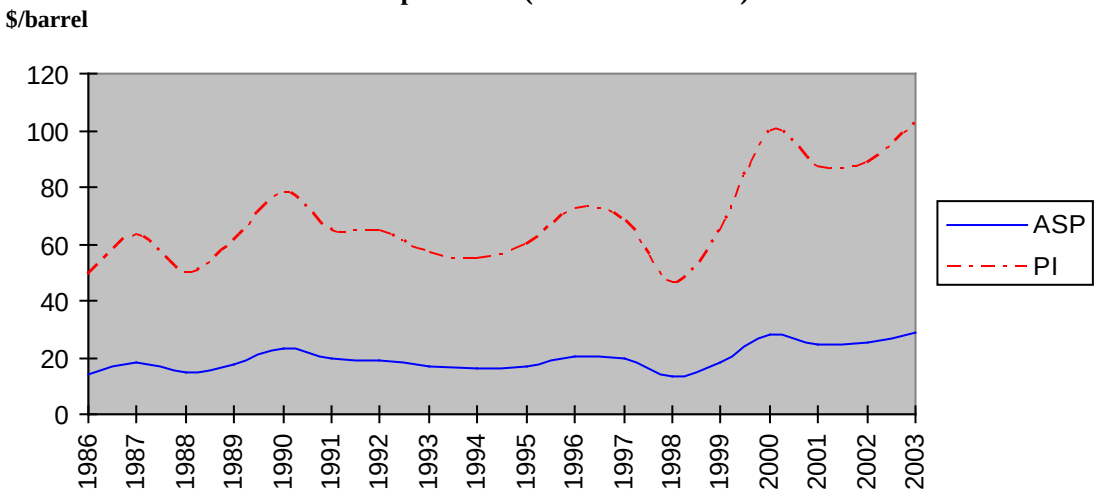
The raw data for crude oil production (in thousands barrels per day) has been sourced from the Energy Information Administration (EIA).[65] Also, crude oil price data has been gathered from the BP Statistical Review of World Energy June 2004 (Price 1986-2003) and UNCTAD Handbook of Statistics 2005 (Price Indices 1986-2003). Table 4.1 shows the average spot crude oil prices and also price indices for this commodity between 1986 and 2003. Moreover, Figure 4.1 indicates how the crude oil average spot price and price indices have changed during this time period. The graph in this figure was drawn based on considering the crude oil price in 2000 being equal to 100. We use the crude oil price to find the relationship between CER and price in our multiple regression analysis in chapter 5, and also to calculate the value of crude oil exports based on its related volume in the case of lack of data for nations such as Kuwait, Libya or United Arab Emirates (UAE) where the data of the UNCTAD – as the main data source of the present study – could not cover every year between 1986 and 2003. We focus on this point in more detail in section 4.2.

There are many nations around the world which have an oil industry and consequently export crude oil. For instance, according to Figure 4.2 in 2000 based on UNCTAD dataset, nearly 100 nations exported crude oil to other countries among their exportable goods but a quick look at the graph reveals that CER in more than 60 percent of these oil exporters has been less than 5 percent. As the figure shows, only a limited number of oil

[65] See Appendix 7.

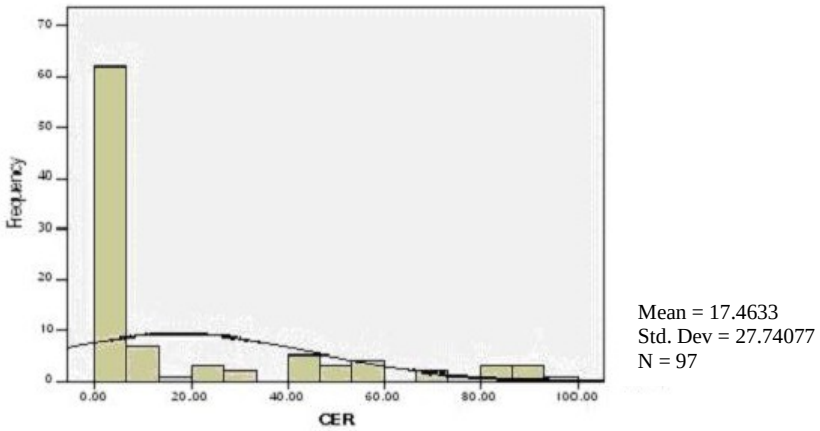
exporting nations around the world have been sufficiently well endowed with oil reserves to have a CER greater than 30 percent. Therefore, in order to have a more homogeneous population in this research we concentrate on this latter group which consists of 20 oil exporting nations with 70 percent[66] of the world's proven oil reserves.

Figure 4.1: Average spot prices (ASP) and price indices (PI) of crude petroleum (Annual 1986-2003)



Indeed, in these nations crude oil could be considered as the most important commodity which has played a key role in their export earnings during past decades, and their economies have been largely dependent on this primary product.

Figure 4.2: Worldwide statistical distribution of CER in 2000



Source: Authors calculations based on UNCTAD Handbook of Statistics 2005

[66] See Table 1.1 (page 20-21) in the first chapter

4.1.2 Trade liberalisation proxy as Supportive Variable

As we mentioned earlier, at the first phase of this research we analyse the changes of CER on two sides of a flexible comparison point in oil exporting nations in particular periods of time (see section 3.2). Indeed, there is an important rationale behind emphasising the comparison point in each nation which could be considered as a crucial stimulus towards freer trade, because WTO rules and regulations strongly support trade liberalisation among members.[67] Therefore, the degree of openness in these countries normally should have been raised in their strategic trade plans to be more active and competitive in the international trade after WTO membership. As a consequence of the afore-mentioned facts, we should investigate any meaningful change in the degree of openness in our sample nations before and after WTO membership point, and to do this in the present study we utilise the 2005 *Economic Freedom of the World* (EFW) dataset.[68] As we said earlier, we use freedom to trade internationally (FTI) to show the degree of trade openness in oil exporting nations. This indicator which has been extracted from the above dataset, measures how open or closed a country is in terms of trade, and it has been computed using several indicators such as international trade tax revenues as a percent of trade sector, mean tariff rate, standard deviation of tariff rates, hidden import barriers, costs of importing, regulatory trade barriers, actual vs. expected size of trade sector, difference between official and black market exchange rates, foreign ownership restrictions, restrictions in foreign capital market exchange/index of capital controls among 13 International Monetary Fund (IMF) categories and international capital market

[67] It should be kept in mind that it is also possible to see a decrease in the degree of trade openness after WTO membership point when FTI has been very high before the membership in a nation or even when a country has been allowed by the WTO to decrease the openness degree in its initial economic development steps.

[68] Economic Freedom of the World: 2005 Annual Report.

controls. These indicators look at different aspects of trade like tariff and non-tariff barriers, capital restrictions, etc (see Appendix 8). To calculate FTI all of the mentioned data are transformed into a scale from zero to ten where a higher score means more economic freedom. Therefore, it provides a meaningful base to analyse trade freedom in each nation.

Table 4.2: Press Coverage of Economic Freedom of the World (2002 Report)

People's Daily (China)	Reforma (Mexico)
The BBC World Service	El Diario (Chile)
Financial Times of London	Singapore Business Times
CNN	Komersant (Russia)
The Daily Star, (Dhaka, Bangladesh)	Vedomosti (Russia
Frankfurter Allgemeine Zeitung	La Nacion (Costa Rica)
Investor's Business Daily	La Republica (Costa Rica)
The Economist	Corporate Mexico
Business Week	Asia Pulse
Agence France-Presse (4 articles)	Asia Times
ITAR-TASS	AsiaPort
Notimex	Daily News Asia
DPA (German Press Agency)	Times Banks & Exchanges (Russia)
Jiji Press	The Christian Science Monitor
Sing Tao Daily (China)	Radio Free Europe
Kyodo News	Radio Free Asia
Xinhua	SBS Broadcasting (Australia)
Japan Economic Newswire	Chinese Radio (US)
Inter Press Service	El Comercio, Ecuador
Press Trust of India	El Financiero, Ecuador
National Post, (Canada)	Latin Trade, Florida
Globe and Mail (Canada)	Economia, Portugal
Ottawa Citizen (Canada)	Público, Portugal
Bloomberg TV	United Press International
Reuters	BNS, Lithuania
South China Morning Post (2 articles)	Lietuvos Aidas, Lithuania
New Zealand Herald	Respublika, Lithuania
Hindustan Times	Lietuvos Televizija, Lithuania
CNN en Espanol	Znad Wilii, Poland
White House Bulletin	Irish Times
Pravda	

Source: Gwartney, J.D. & Lawson, R.A., 2003. The Impact of the Economic Freedom of the World Index.

In fact, FTI has been computed for nations on a five-year basis from 1970 to 2000, and on an annual basis from 2000 as one of the five initial factors to measure the economic freedom of the world (EFW) index[69] which has been developed by Gwartney *et al*. (2002) in recent years as an economic freedom index for a large set of nations around the world. This index has been used widely in a variety of studies[70] to investigate the sources of cross-country differences in income levels, growth rates, and other indicators of economic performance. Table 4.2 shows some of the media which have covered the release of the EFW 2002 annual report. We study FTI as a supportive variable for WTO membership to show how WTO membership directly or indirectly relates to the degree of trade liberalisation in a nation. Indeed, there are two reasons for using FTI in an indirect way in this study. Firstly, this factor has been calculated on a five-year basis (for years before 2000) which could reduce the regression points. Besides this, FTI is not available for all nations. In spite of these two weak points, we can still provide a very powerful foundation to indicate that WTO rules persuade most of member-nations towards accepting high levels of trade liberalisation. FTI data for 11 WTO member countries in our research population[71] from 1985 to 2003 can be seen in Table 4.3.

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[69] "The Economic Freedom of the World (EFW) index is an outgrowth of a series of conferences sponsored by the Fraser Institute during 1986-1994. The conferences were hosted by Milton and Rose Friedman along with Michael Walker of the Fraser Institute." For more information on the proceedings of these conferences and the development of the index, see Walker (1988), Block (1991), and Easton and Walker (1992). Four other factors to calculate EFW namely are Size of Government, Legal Structure and Security of Property Rights, Access to Sound Money, and Regulation of Credit, Labor, and Business. Quoted in Gwartney and Lawson (2003:1)

[70] "Susanna Lundstrom (Goteborg University, Sweden) used the EFW to investigate the interrelationships between institutions, economic growth, and environmental quality. Julio Cole (Universidad Francisco Marroquín, Guatemala) has also used the EFW data in his [doctoral] dissertation, which focuses on the explanation of cross-country differences in economic growth." Quoted in Gwartney and Lawson (2003:5)

[71] FTI was not available for Angola, Brunei, Libya, Qatar, Saudi Arabia and Yemen.

Table 4.3: Freedom to Trade Internationally (1985-2003)

***WTO** member-states*	***1985***	***1990***	***1995***	***2000***	***2001***	***2002***	***2003***
Cameroon	6.1	5.4	5.2	5.8	6.0	5.8	5.5
Congo, Rep. Of	6.1	5.8	6.8	6.8	6.9	6.8	6.7
Ecuador	3.9	5.8	6.7	7.2	7.0	6.7	6.7
Egypt	3.3	3.5	5.9	6.1	6.2	5.0	5.1
Gabon	6.2	5.8	5.9	5.6	6.0	6.0	5.8
Kuwait	6.9	7.0	6.8	7.2	7.2	7.1	6.9
Nigeria	3.4	5.4	4.6	5.9	6.6	6.9	6.9
Norway	7.6	7.9	8.0	7.6	7.5	7.0	7.4
Oman	7.1	7.0	6.8	7.9	7.9	7.8	7.9
Unit. Arab Em.	7.7	7.9	na	8.2	8.2	8.2	8.3
Venezuela	5.3	6.8	5.2	7.2	7.0	4.5	4.6

Source: Gwartney, James and Robert Lawson (2005). *Economic Freedom of the World: 2005 Annual Report.* Vancouver: The Fraser Institute. Data retrieved from www.freetheworld.com.

4.1.3 Dependent Variables (CER estimation based on XC and TE)

XC and *TE* (two main parts of the CER function) are two dependent variables in the first phase of this research which can be utilised to examine the level of export dependency of oil exporting nations on crude petroleum. In this section, we focus on these variables and their related data sources. XC and TE, which we need in order to calculate CER for our research population between 1986 and 2003, are represented at current price and rounded to one decimal place in Appendix 9. There are 20 tables in alphabetic order in this appendix to show the dependency of the WTO member and non-member countries in the research population on crude oil exports before and after 1995, which is the birth year of the WTO. To explain the information in these tables, we consider Table 4.4 as a sample with regard to the CER and ETOV demonstrations in chapter 3.

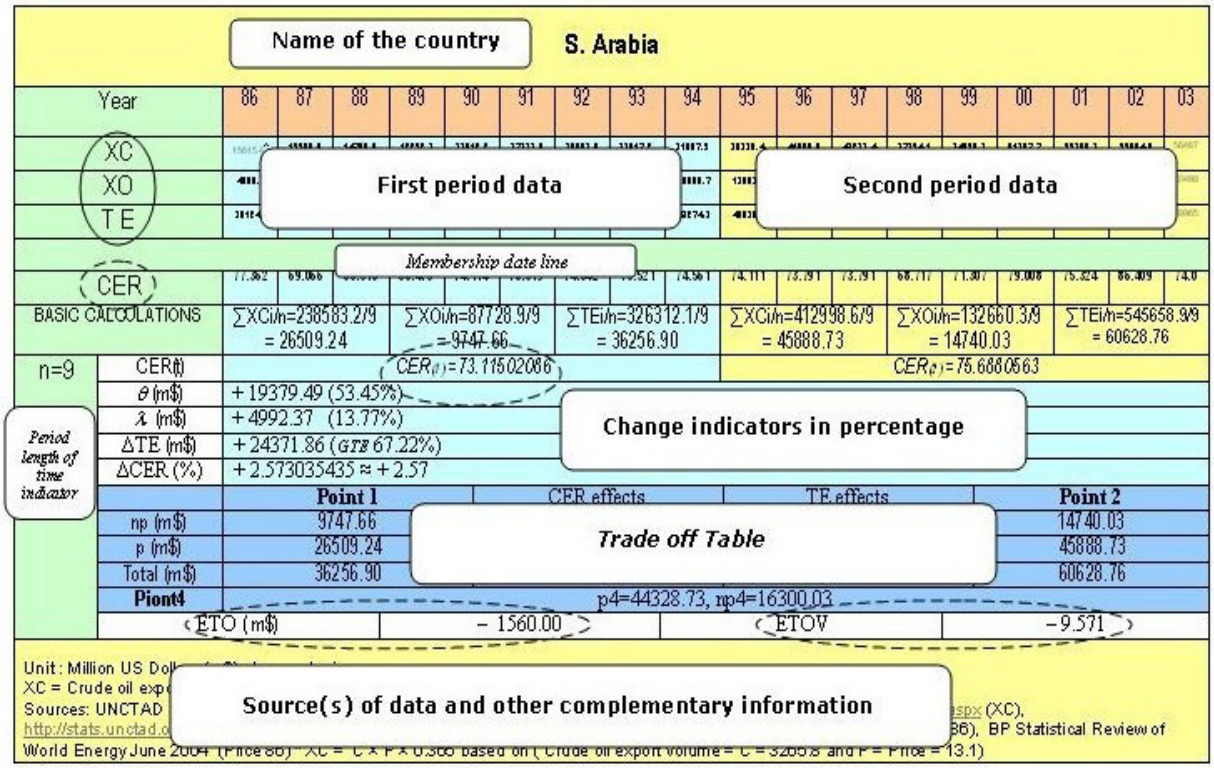
As input, we need XC, TE, and the membership date in the WTO if the nation is a member. If the country is not a WTO member we consider 1995 as the comparison point and then we calculate *the period length of time indicator (n)* based on data availability for

the nation. Then we are able to complete the rest of these tables to find CER1, CER2 and ETOV. Here, it is important to consider two points about these tables in Appendix 9.

1- These tables show the procedure of calculating the afore-mentioned indicators according to the related information in section 3.2. Although, the comparison point for each nation depends on the availability of the data, the procedure remains the same.

2- These indicators can be utilised as input to analyse the data based on with-without and before-after approaches in the next chapter.

Table 4.4: Crude oil export share of total (Sample Table)



Although, rationally making a profit from international trade is the most meaningful reason to be involved in this kind of activity for every nation, there is no evidence to

show how this potential profit could actually be distributed amongst different countries.[72] The comparative advantage theory based on a world with two nations and two commodities just says free trade could be beneficial for the world as a whole but a country which specialises in producing a particular primary product, such as crude oil, may take more risk to obtain greater benefits from international trade than a nation with a variety of competitive manufactured commodities. According to Salvatore (2001), a nation which starts integrating in world trade should try to change its comparative advantage towards manufactured goods, and the methodology which we employed in chapter three is a procedure to show this change. In this method, we measure CER on two sides of each comparison point to find any change in the export pattern of oil exporters. Also, we calculate ETOV as an alternative factor for CER computation in these nations. If, as a result of WTO membership in the second period, CER is lower than the first period (a negative relationship between WTO membership and CER) or ETOV between the two periods is positive, and also the export portfolio analysis shows diversification, we can say that the nation has started moving away from path ***A*** towards path ***B*** with a higher share of non-primary products in their total exports.

4.2 Alternative Data Sources and XC Calculation

There is a variety of sources of secondary statistical data about oil exporting nations and their related exportable products around the world with different reliability levels. With respect to commodity trade and international business data on which we have

[72] Based on international economic theories the amount of benefit for each of two nations in the two-country, two-commodities model depends on an equilibrium relative commodity price with trade, but in the real world with more than 200 nations and many different commodities finding such a point does not seem to be practical.

concentrated in this research, one of the most important available databases is UNCTAD. Statistical data about products trade including crude oil exports (XC) and total exports (TE) which have been published in the UNCTAD Handbook of Statistics 2005,[73] have been classified based on the SITC system in this dataset and can be helpful to find related information about nations in our research population. Table 4.5 indicates the export data which we have gathered from this main source. This table also shows that 602 out of 720 of the export data[74] points which we have utilised in this research, directly came from the UNCTAD handbook which is 83.61 percent of the total points. Finally, as we mentioned earlier, crude oil production data in thousands barrels per day was derived from the Energy Information Administration (EIA).

Although, the above-mentioned handbook offers the most up-to-date high quality trade data for most of the nations around the world, for some data points especially, including Kuwait, Libya and United Arab Emirates, XC seems to be ambiguous. For example, based on UNCTAD dataset, we have found some data points at which XC suddenly and unusually has declined in value while the main trend indicates that it is not possible for this to happen, so we referred to XC in other databases and the results confirmed our idea about those wrong points. Therefore, to control the dataset and to support our findings reliability, we have investigated other important alternative databases such as the BP Statistical Review of World Energy June 2004 and the OPEC Annual Statistical Bulletin from 1996 to 2004. With reference to Table 4.5, we concentrated on Kuwait, Libya and

[73] This handbook can be found online on the following address: http://stats.unctad.org/Handbook/TableViewer/tableView.aspx

[74] In the case of considering CER related data which consists of data points for crude oil PRICE and FTI besides UNCTAD data, the total data points would be 836, including 18 points for PRICE and 97 points for FTI.

Table 4.5: UNCTAD Handbook of Statistics 2005 and CER analysis

Country	Data Coverage between 1986 and 2003		Number of data point		Explanation
	XC	TE	available	Unavailable	
Algeria	√	√	**36**	**0**	**---**
Angola	√	√	**36**	**0**	**---**
Brunei	√	√	**36**	**0**	**---**
Cameroon	√	√	**36**	**0**	**---**
Congo (Rep)	√	√	**36**	**0**	**---**
Ecuador	√	√	**36**	**0**	**---**
Egypt	√	√	**36**	**0**	**---**
Gabon	*	√	**34**	**2**	* XC for 1986 and 2003 are not available
Iran	*	√	**35**	**1**	* XC for 1986 is not available
Kuwait	*	*	**0**	**36**	* XC between 1986 and 2003 has been calculated based on alternative dataset
Libya	*	*	**0**	**34**	* XC between 1988 and 2003 has been calculated based on OPEC Bulletins
Nigeria	*	√	**35**	**1**	* XC for 1986 is not available
Norway	√	√	**36**	**0**	**---**
Oman	*	*	**34**	**2**	* XC and TE for 1986 is not available
Qatar	*	√	**35**	**1**	* XC for 1986 has been calculated based on alternative dataset
Saudi Arabia	*	√	**35**	**1**	* XC for 1986 has been calculated based on alternative dataset
Syria	√	√	**36**	**0**	**---**
United Arab Emirates	*	*	**0**	**36**	* XC between 1986 and 2003 has been calculated based on alternative dataset
Venezuela	√	√	**36**	**0**	**---**
Yemen	*	√	**32**	**4**	* XC for 1986,87,91 and 92 are not available

the United Arab Emirates, in order to find more accurate XC[75] for these three important nations in this study and to do this, we utilised the OPEC Annual Statistical Bulletin 2004. But crude oil export data in the new dataset historically has been offered in volume in thousands barrels daily (TBD), while in order to find crude oil dependency in our research, we need the value of annual crude oil exports in each nation in our population. Therefore, with regard to the volume of crude oil exports which we gathered from the OPEC bulletin 2004, for normal years, we compute the value of crude oil exports as follow[76]:

$$Value_i = Volume_i \times P_i \times 0.365 \quad (4.1)$$

Also for leap years[77] we could write:

$$Value_i = Volume_i \times P_i \times 0.366 \quad (4.2)$$

Where (i) denotes each specific year.

There are three important points about equations 4.1 and 4.2:

1- There are four leap years between 1986 and 2003 which respectively are 1988, 1992, 1996 and 2000.

2- The value of crude oil exports (XC) between 1986 and 1989 and also 1991 for Kuwait have been computed based on prices in Column 1, Table 4.1. For the rest of the years between 1986 and 2003, we have used Kuwait specific prices which have been extracted from OPEC bulletins between 1999 and 2004.

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[75] Complementary information about (XC) calculation for 1986 based on the above-mentioned equations for Qatar and Saudi Arabia can be found in Appendix 9.

[76] The alternative relationship between crude oil value and volume can be written as follow:
***Value** (million US dollar)i* = 1000 × ***Volume** (TBD)i* × ***PRICE** (US dollar)i* × *365* × *1/1000000*

[77] A leap year is a year with one extra day inserted into February; the leap year is 366 days with 29 days in February as opposed to the normal 28 days.(For more information about leap year see online: http://www.timeanddate.com/date/leapyear.html)

3- The value of crude oil exports (XC) between 1988 and 2003 for Libya has been computed based on price and production volume which have been extracted from OPEC bulletins 1996, 1999 and 2004.
4- To calculate the value of crude oil exports (XC) for United Arab Emirates, we have utilised Dubai spot prices between 1986 and 2003 which have been published in the BP Statistical Review of World Energy, June 2004. (Column 1, Table 4.1)

The data for RSCA analysis in the second phase has been obtained from the UNCTAD dataset which is available online. The amount of exports for each specific product in this database has been derived based on the standard international trade classification (SITC) three-digit standard code. In fact, because of the huge volume of the data which we used in this research to analyse export diversification in oil exporting nations, we could not present the dataset in this thesis, but it is possible to see the UNCTAD online handbook via the following web address:

http://stats.unctad.org/Handbook/TableViewer/tableView.aspx?ReportId=135

4.3 Chapter Summary

In this chapter we described the variables which will be used in the empirical analysis. These variables have been categorised into three different groups which comprise crude production and price as traditional factors, FTI as the supportive indicator and also CER (based on XC and TE) as the dependent variable. Moreover, we explain about the related datasets which reliably offer data to address the questions of the present research. Also, this chapter provided alternative data sources such as BP, EIA or OPEC to support the

main dataset which comes from UNCTAD in the case of any missing data. While the data which we utilise to analyse CER can be found in the appendices, RSCA related data can be seen in the UNCTAD online handbook (in its web address), because to study the export portfolio of 18 oil exporting nations[78] in the second phase of this research we gathered thousands of data points considering the number of their exportable products for 18 years between 1986 and 2003.

[78] Kuwait and UAE are excluded from the phase two analysis because of lack of data in the related periods of time.

Chapter 5

CER Analysis

Introduction

This chapter provides the results of the crude oil export ratio (CER) analysis which can tell us what really happened to export dependency on crude oil in petroleum exporting nations following their membership of the WTO. The present chapter consists of seven sections. The first section focuses on freedom to trade internationally (FTI) as the trade openness proxy and demonstrates how it has changed after WTO membership in oil exporting nations. CER is studied in the second section to investigate whether or not WTO membership has stimulated oil exporters to change their export portfolio with a considerable decline in the share of crude petroleum in their total annual exports. To support our findings about CER behaviour, we also focus on export trade off value (ETOV) as an alternative factor in section three. In the fourth part of this chapter we briefly demonstrate the reasons which lead us to a systematic regression analysis of related data at a disaggregate level in oil exporting nations. Then, we study the CER basic equation and different factors which can affect it in the environment in section five. The

linear regression model and the results which can be extracted from such an equation in each different WTO member-states have been studied in the sixth part of the present chapter. Finally, in the last section we summarise the conclusions we have reached in this chapter.

5.1 FTI Analysis

Following the present research methodology and with respect to the first part of question A in this study, we start our analysis with FTI investigation as a supportive factor to investigate any change in the trade liberalisation index in WTO member-states based on an aggregative before-after approach. To do this, we analyse the FTI from 1986 to 2003 in 11 member countries for which the relevant data is available (see Table 4.3).

As we have seen earlier, the data in the above-mentioned table has originally been presented on a five-year basis from 1985 to 1999, therefore because of the lack of annual data for the years before 2000 and to have a reliable average, we consider two time periods based on this table which respectively are 1985-1990 as the base time and 2000-2003 as the terminal time. Then, we are able to calculate the average FTI and aggregate average FTI (AAFTI) for this group of oil exporting nations in Table 5.1. A quick evaluation of the numbers in Table 4.3 at the aggregate level for FTI tells us that the trade liberalisation degree in these countries after membership in the WTO has been bigger than the degree of trade freedom before membership on average. In spite of this, taking a closer look at the disaggregate average of FTI for each single nation reveals that Gabon, Norway and Venezuela have experienced diminishing trade liberalisation between these two time periods.

Table 5.1: Aggregate Average FTI before-after comparison for Selected WTO-members between 1985 and 2003

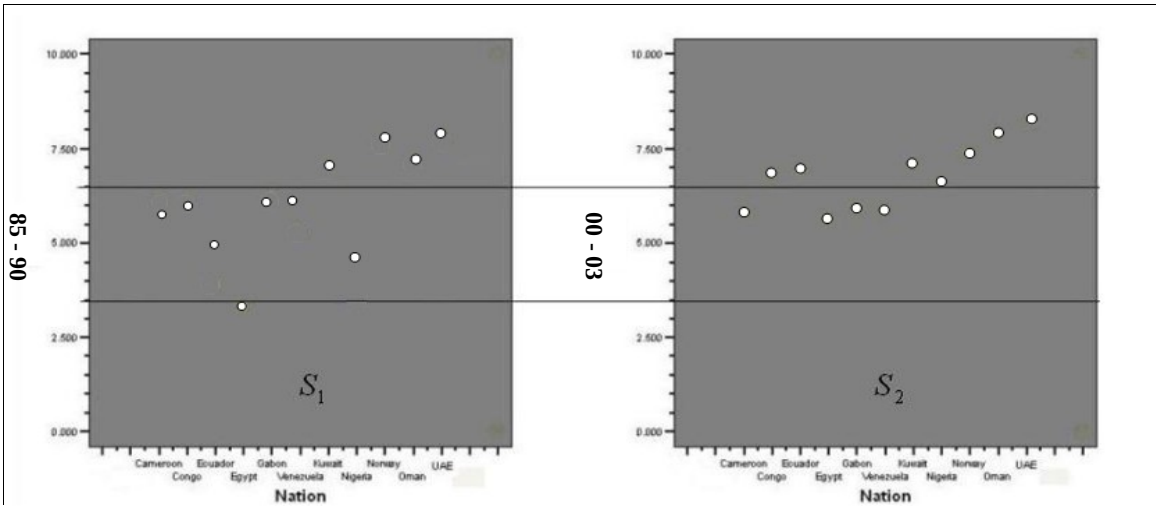
Countries	Average FTI	
Time Periods	1985-1990*	2000-2003
Cameroon	5.750	5.775
Congo	5.968	6.800
Ecuador	4.860	6.900
Egypt	3.413	5.600
Gabon	6.013	5.850
Kuwait	6.932	7.100
Nigeria	4.410	6.575
Norway	7.749	7.375
Oman	7.026	7.875
UAE	7.818	8.225
Venezuela	6.055	5.825
AAFTI	5.999523	6.71818
Standard deviation	1.37486	0.890933
Differences Mean	-0.71909	
t value	(-2.413)	
Confidence level	95%	
* Average FTI based on 1985 and 1990		

The result of FTI analysis in WTO member-states which has been summarised in the last three lines of the above table indicates AAFTI meaningful changes between two different situations, 1985-1990 (S_1) and 2000-2003 (S_2) respectively on two sides 5 years before and 5 years after 1995 as the basic comparison point.[79] With regard to these computations a meaningful change in the trade liberalisation degree (at an aggregate level) can be seen between S_1 and S_2 at a 95 percent level of confidence.

[79] These two time periods (1985-1990) for S1 and (2000-2003) for S2 not only highlights the FTI gradual changes between 1985 and 2003 but also covers the effects of different dates of membership in the WTO for the nations in our research population.

Demonstrating the increase in AAFTI level for WTO member-states between S_1 and S_2 in Table 5.1 based on WTO rules and regulations which support freer trade among nations around the world can be fully justified. To explain these changes in more detail, we redesigned the related FTI numbers in Figure 5.1. In this figure we have three separated zones. The first zone shows closed economies with FTI between 0 and 3.5. Middle economies with $3.5 \leq FTI \langle 6.5$ are shown in the second zone. The third area indicates nations which have utilised an open trade strategy with $6.5 \leq FTI \leq 10$. According to this figure, we can illustrate the openness changes in these nations based on FTI scaling from 0 to 10. Some of the WTO member-states had experienced free trade systems and very high FTI even before their membership in the WTO. In the first time period we had one country in the closed economy zone, while there was no nation in this zone in S_2. Besides this latter fact, as the figure shows, the number of countries in the open economy zone with FTI equal to 6.5 or more in the second period has nearly doubled in comparison with S_1.

Figure 5.1: Disaggregate Average FTI before-after comparison for selected WTO member-countries



To sum up, based on these findings about the changes in degree of trade freedom between S_1 and S_2 in these selected oil exporters, we should say that the degree of openness has shown a meaningful increase between the base and terminal time periods in WTO member-states.[80] In the next section, we study the change in CER for oil exporting nations to see how it has changed while the trade has been liberalised during the period.

5.2 CER Analysis

The crude oil export ratio (CER), which measures the rate of export dependency of oil exporting nations on crude oil will be analysed in this section, in order to have a clear picture of the behaviour of this variable in both WTO member-states and non-member nations, and to do this, we firstly refer to our basic tables in Appendix 9. We utilise the data in this appendix between 1986 and 2003 to investigate CER before and after each comparison point in our three pre-determined time periods (TP_s) which we have mentioned in section 3.2 for the following two reasons:

1- Comparing average aggregate CER for WTO member-states (before-after approach).
2- Comparing average aggregate CER for both WTO member-states and non-member nations (with-without approach).

[80] We derived this supportive investigation in this research to indicate that one of the most probable events which can be expected to be seen after WTO membership, is trade liberalisation.

Table 5.2: CER for WTO member-states between 1986 and 2003

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Angola	61.37	91.02	82.57	79.76	92.03	91.53	92.60	91.53	89.30	88.20	90.24	88.88	84.40	83.95	88.37	87.55	89.64	94.12
Brunei	40.58	48.78	42.50	46.81	50.88	47.45	54.29	50.88	49.85	49.85	41.50	41.50	33.74	44.37	44.37	44.37	47.37	48.79
Cameroon	9.50	17.13	73.84	17.92	49.73	49.73	49.73	28.94	28.94	28.94	35.72	32.87	48.03	48.03	48.03	46.27	45.77	44.50
Congo	84.66	72.94	76.14	78.37	81.43	92.31	92.31	92.29	81.36	85.92	85.91	85.91	64.07	65.48	69.96	72.22	75.41	72.84
Ecuador	43.36	31.96	44.50	43.87	46.36	37.14	41.12	38.05	30.83	32.00	31.10	26.93	18.77	29.48	44.46	37.06	36.47	39.29
Egypt	38.85	25.81	21.73	21.15	18.55	45.98	37.96	42.34	22.84	20.88	23.1	17.1	5.07	8.37	13.3	7.15	6.75	5.53
Gabon	na	66.99	58.29	74.42	75.01	88.21	88.21	88.21	85.66	81.3	81.3	76.49	81.94	76.54	81.43	81.57	81.71	na
Kuwait	49.85	45.44	43.53	42.28	50.35	47.42	65.31	72.18	57.79	53.88	55.40	51.84	51.20	47.65	59.75	58.41	63.88	59.00
Nigeria	na	94.56	91.37	92.63	95.89	96.48	94.45	94.27	89.66	96.81	95.33	94.75	96.94	98.94	99.36	98.26	89.2	96.4
Norway	21.24	25.67	22.76	31.93	35.11	36.49	37.85	39.46	37.90	36.73	42.87	39.75	29.90	37.64	48.98	45.40	43.31	42.71
Oman	na	91.47	87.67	88.91	89.11	84.06	83.29	78.27	75.81	77.85	79.82	74.01	64.98	74.36	80.42	69.16	66.72	68.3
Qatar	68.65	74.84	61.99	69.65	76.43	69.63	64.75	65.22	62.58	65.23	66.76	55.65	59.34	55.65	43.41	52.41	35.01	50.19
UAE	53.24	60.06	52.20	51.55	55.66	50.29	52.26	45.47	38.40	38.77	39.19	38.13	29.26	33.11	34.89	30.50	26.81	30.41
Venezuela	46.35	71.51	45.86	44.09	79.68	50.29	50.51	47.62	48.51	44.93	54.68	53.2	45.67	53.67	58.93	58.31	76.39	81.03

5.2.1 CER analysis for WTO member-states

Referring to our main concern about crude oil dependency analysis, at this stage we concentrate on CER changes in oil exporting nations before and after their membership in the WTO. If ΔCER for a nation between S_1 and S_2 is negative, it means that the country has fulfilled one of two conditions to be on path B,[81] while a positive ΔCER *(as result of WTO membership)* could address no movement towards path B. Table 5.2 shows related CER for WTO member-states during 1986-2003. There are two different methods to compute aggregate average CER for WTO member-states as follows:[82]

1- Simple Average Method

In this method we extract the related data from Table 5.2 for each nation to calculate Simple Average CER (SACER) based on the following equation:

$$SACER = \frac{CER_1 + CER_2 + ... + CER_n}{n} \tag{5.1}$$

where (n) denotes the number of years with respect to each specific time period.

2- Mixed Average Method

In order to investigate CER in a different way utilising our basic data tables in the Appendix 9, we concentrate on a new type of average CER which can be identified by the following formula:

$$MACER = \frac{XC_1 + XC_2 + ... + XC_n}{TE_1 + TE_2 + ... + TE_n} \tag{5.2}$$

where (n) represents the number of years with respect to each specific time period. We call this Mixed Average CER (MACER).

[81] For more information about the paths A and B and their related conditions see sections 1.2 and 3.1.

[82] The results of CER computation have been summarised in 20 tables in Appendix 9.

Obviously, in spite of any differences between the style of calculations and its impact on the final conclusion, doing a CER analysis based on the above two methods leads to more reliable results than just utilising the simple average computation.

5.2.1.1 CER analysis for WTO member-states (Simple Average Method)

As Table 5.3 shows, a simple average CER and a simple aggregate average CER (SAACER) have been computed with respect to equation 5.1 in three basic time periods (TP_S) for WTO member-states. According to these calculations, we can clearly see a decrease in SAACER in all three TP_S, albeit by varying quantity. Concentrating on Figure 5.2 which indicates that there is a negative slope line to represent any change between S_1 and S_2 for each TP supports this idea that says: this group of oil exporting nations may have reacted to WTO membership in the same way.

Figure 5.2: Simple Aggregate Average CER before-after time periods for WTO member-states between 1985 and 2003

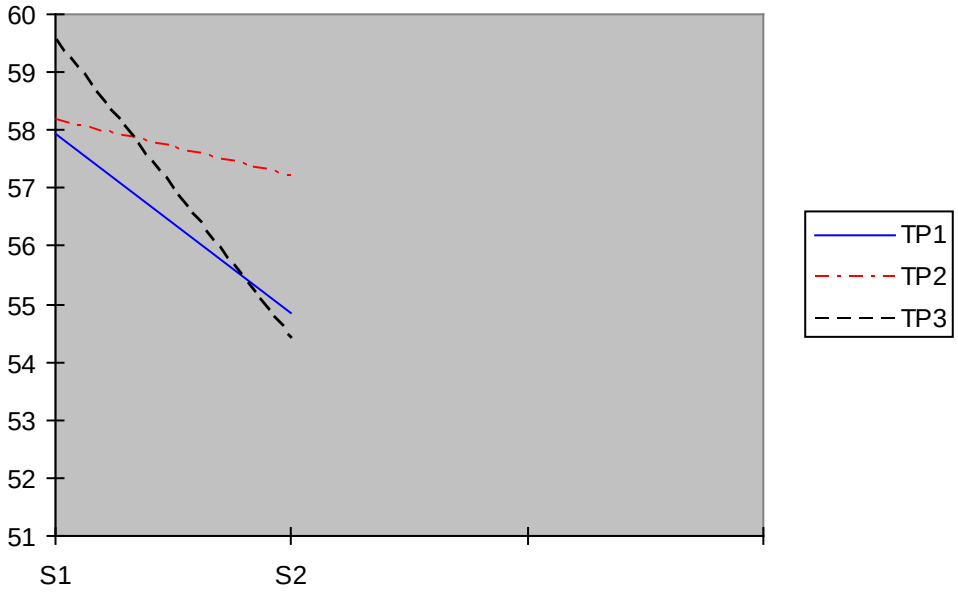


Table 5.3: Simple Aggregate Average CER for WTO member-states between 1985 and 2003[83]

Countries	TP_1 Simple Average CER		TP_2 Simple Average CER		TP_3 Simple Average CER	
	1986-1994	1995-2003	1986-1990	2000-2003	1990-1996	1997-2003
Angola	85.74556	88.37222	81.35	89.92	90.77571	88.13
Brunei	48.00222	43.98444	45.91	46.225	49.24286	43.50143
Cameroon	36.16222	42.01778	33.624	46.1425	38.81857	44.78571
Congo	83.53444	75.30222	78.708	72.6075	87.36143	72.27
Ecuador	39.68778	32.84	42.01	39.32	36.65714	33.20857
Egypt	30.57889	11.91667	25.218	8.1825	30.23571	9.038571
Gabon	78.125	80.285	68.6775	81.57	83.98571	79.94667
Kuwait	52.68333	55.66778	46.29	60.26	57.47571	55.96143
Nigeria	93.66375	96.22111	93.6125	95.805	94.69857	96.26429
Norway	32.04556	40.81	27.342	45.1	38.05857	41.09857
Oman	*	*	89.29	71.15	*	*
Qatar	68.19333	53.73889	70.312	45.255	67.22857	50.23714
UAE	51.01444	33.45222	54.542	30.6525	45.72	31.87286
Venezuela	53.82444	58.53444	57.498	68.665	53.74571	61.02857
SAACER	57.9431507	54.8571361	58.17029	57.20393	59.5387892	54.4110623
Standard deviation	21.6695573	24.4633093	22.611247	24.316243	22.8228470	24.7122678
Differences Mean	- 3.086015		- 0.96636		- 5.127727	
t value	*1.199*		*0.243*		(2.039)	
Significance level	*90%*		*90%*		90%	

As Figure 5.2 describes, SAACER has declined between S_1 and S_2 for these nations in each of the three time periods respectively by –3.09, –0.97 and –5.13. Despite these results, as the above table indicates, the change in SAACER has been statistically

[83] Since Oman was not a WTO member before 2000, we have not computed a simple average CER for this nation between S_1 and S_2 in the first and third TP_S.

significant only in TP_3. Besides this, when we concentrate on disaggregate information in the Table 5.3 for each specific country, we realise that the simple average CER trends have not been downward for all of these nations between S_1 and S_2.

5.2.1.2 CER analysis for WTO member-states (Mixed Method)

In the previous section we analysed CER behaviour before and after different comparison points using the simple average of yearly-based CER for each period, but alternatively in this section, we compute CER for each period in two sides of the comparison points. This alternative method can lead to a deeper CER analysis based on periodic CER calculation. Table 5.4 indicates mixed average CER and mixed aggregate average CER (MAACER) which have been computed with regard to equation 5.2 for WTO member-states between 1986 and 2003. As the table indicates, once again, like SAACER, these computations show a decrease in MAACER in all three time periods.

Figure 5.3: Mixed Aggregate Average CER before-after time periods for WTO member-states between 1985 and 2003

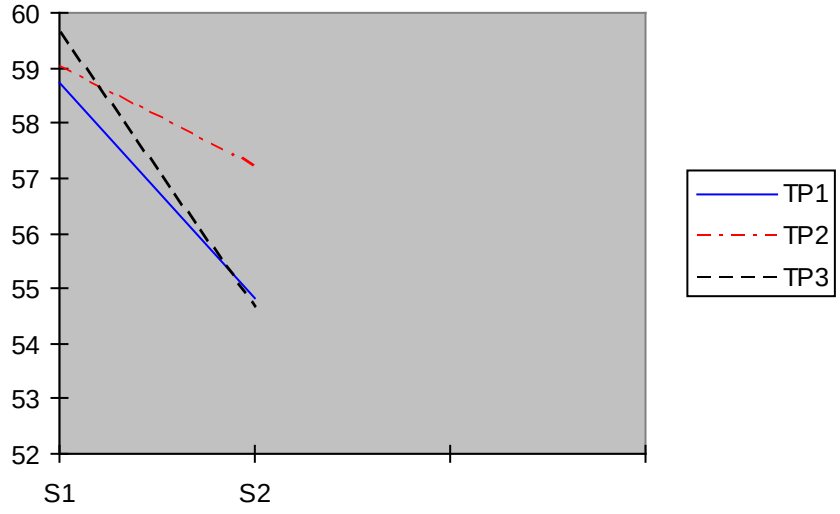


Table 5.4: Mixed Aggregate Average CER for WTO member-states between 1985 and 2003[84]

Countries	TP_1 Mixed Average CER		TP_2 Mixed Average CER		TP_3 Mixed Average CER	
	1986-1994	1995-2003	1986-1990	2000-2003	1990-1996	1997-2003
Angola	87.69034	88.95731	84.12662	90.23219	90.8571	88.8618
Brunei	48.31073	44.3952	46.20055	46.46991	48.98399	44.222
Cameroon	38.5161	42.15598	36.68278	46.05151	39.70262	44.63604
Congo	83.97475	74.60789	78.53188	72.32947	87.45874	72.24191
Ecuador	39.09127	33.20212	42.08204	39.30577	35.67031	33.65342
Egypt	31.49426	11.36263	24.87394	7.998657	30.49705	8.907544
Gabon	80.3776	80.40807	69.96857	81.56672	83.80121	80.03059
Kuwait	53.35048	56.38765	45.81202	60.11664	58.53453	56.82244
Nigeria	93.81598	96.38888	93.59324	96.16835	94.85642	96.44814
Norway	33.41137	41.51497	28.46556	45.02445	38.28289	41.86514
Oman	*	*	89.31414	71.07977	*	*
Qatar	68.06916	51.15299	70.76098	46.2739	67.28294	49.23372
UAE	49.92623	32.7837	54.57095	30.59587	45.07078	31.55829
Venezuela	55.41047	59.54111	61.17106	68.0067	54.09315	61.90778
MAACER	58.72605692	54.83526923	59.01102	57.22999	59.62244077	54.64529338
Standard deviation	21.72937543	24.60585959	22.583867	24.346893	22.85104963	24.82747642
Differences Mean	- 3.890788		- 1.78103		- 4.977147	
t value	*1.507*		*0.473*		(1.935)	
Significance level	*90%*		*90%*		90%	

According to Figure 5.3 MAACER has decreased between S_1 and S_2 in each of the three time periods respectively by –3.89, –1.78 and –4.98. Although, the aggregate CER in this type of computation in all time periods have been downward, the disaggregate data shows

[84] Since Oman was not a WTO member before 2000, we have not computed a simple average CER for this nation between S_1 and S_2.

that in some nations CER behaved in a different way between S_1 and S_2. Therefore, based on the results of two CER tests in sections 5.2.1.1 and 5.2.1.2 we can say at an aggregate level WTO membership may lead the member-nations to a decrease in economic dependency upon crude oil exports.

5.2.2 CER analysis to compare WTO member-states and non-member nations

In this section, in order to evaluate the impact of WTO membership on member-states, we focus on the differences between what actually happened and what would have happened in the absence of the membership, and to do this we compare CER trends in these member-nations with WTO non-member countries. The first step to compare two "with and without" countries is finding pairs of nations as the treatment and control groups. Referring to our research population, we can see 6 non-member countries which should be paired with 6 similar WTO member-states. Clearly, here we are talking about finding approximate similarities which lead us towards better comparison results in this study because this kind of perfect similarity, even between two nations, never exists. In the present research, to find pairs of similar countries we focus on three different criteria which are GDP per-capita, GNI per-capita and CER. Table 5.5 shows the data which we have utilised to find each pair of nations for our two basic groups to do CER comparison tests in both simple and mixed average methods. To start our CER analysis based on the with-without approach, first of all, we focus on Table 5.6 which indicates related CER for these two groups of oil exporting nations during 1986-2003. Also, we use equations 5.1 and 5.2 respectively to analyse simple and mixed aggregate average CER in the next two sections.

Table 5.5: Matching data for WTO member-states and non-member nations between 1986 and 1995 [85]

WTO non-member nations 1986-1995				WTO member-states 1986-1995			
Countries	GDP per-capita	GNI per-capita	CER	Countries	GDP per-capita	GNI per-capita	CER
Algeria	2121.8	2049.7	44.55	Venezuela	2854.0	2771.9	52.94
Iran	1669.1	1657.3	85.19	Congo	945.7	813.6	83.77
Libya	6144.1	6197.0	77.55	Gabon	4791.4	4071.0	78.48
Saudi Arabia	6137.4	6204.7	72.39	Oman	5767.2	5634.7	84.05
Syria	924.6	883.6	41.66	Egypt	805.5	744.0	29.61
Yemen	365.75	371.25	81.33	Nigeria	349.9	320.0	94.01

5.2.2.1 CER analysis for WTO member and non-member nations (Simple Average Method)

As can be seen from Table 5.7, a simple average CER and a simple aggregate average CER (SAACER) have been calculated in three basic time periods (*TPs*) for WTO member-states and non-member countries at the same time. As these computations indicate, while we see a decrease in SAACER in every time period for the nations in the first group which are WTO members, there is an upward SAACER trend for the other group in all three time periods. The divergent behaviour of SAACER, in these two groups of oil exporting nations which have been paired based on having similar GDP per-capita, GNI per-capita and *CER* trends between 1986 and 1995 persuades us to suppose WTO membership as one of the most important source of these differences between member-states and non-member nations.

[85] For more information see Appendix 10.

Table 5.6: CER for paired (WTO member-states and non-member countries) between 1986 and 2003

Simple Average Method																		
WTO non-members																		
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Algeria	39.85	45.5	42.72	46.7	48.91	42.92	43.16	44.06	45.67	46.06	48.01	40.64	41.51	39.72	42.01	37.27	42.25	46.1
Iran	na	89.99	90.25	90.29	91.1	82.78	81.85	75.69	80.14	84.6	84.6	84.39	77.24	83.21	87.23	82.1	84.36	83.4
Libya	na	na	71.21	71.81	71.66	80.90	78.19	80.99	82.91	82.69	85.27	82.33	90.63	82.21	82.87	78.54	78.01	84.87
Saudi Arabia	77.36	69.07	60.31	66.48	74.11	78.32	74.04	75.52	74.56	74.11	73.79	73.79	68.72	71.31	79.01	75.32	86.41	74.04
Syria	25.34	33.23	24.22	27.09	34.88	45.89	59.83	55.06	55.55	55.55	63.36	56.85	49.15	64.33	69.15	71.04	64.92	62.53
Yemen	na	na	71.03	78.07	86.95	na	na	72.55	89.7	89.69	86.69	87.82	81.76	88.7	90.15	94.72	91.6	82.22
WTO member states																		
	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Venezuela	46.35	71.51	45.86	44.09	79.68	50.29	50.51	47.62	48.51	44.93	54.68	53.2	45.67	53.67	58.93	58.31	76.39	81.03
Congo	84.66	72.94	76.14	78.37	81.43	92.31	92.31	92.29	81.36	85.92	85.91	85.91	64.07	65.48	69.96	72.22	75.41	72.84
Gabon	na	66.99	58.29	74.42	75.01	88.21	88.21	88.21	85.66	81.3	81.3	76.49	81.94	76.54	81.43	81.57	81.71	na
Oman	na	91.47	87.67	88.91	89.11	84.06	83.29	78.27	75.81	77.85	79.82	74.01	64.98	74.36	80.42	69.16	66.72	68.3
Egypt	38.85	25.81	21.73	21.15	18.55	45.98	37.96	42.34	22.84	20.88	23.1	17.1	5.07	8.37	13.3	7.15	6.75	5.53
Nigeria	na	94.56	91.37	92.63	95.89	96.48	94.45	94.27	89.66	96.81	95.33	94.75	96.94	98.94	99.36	98.26	89.2	96.4

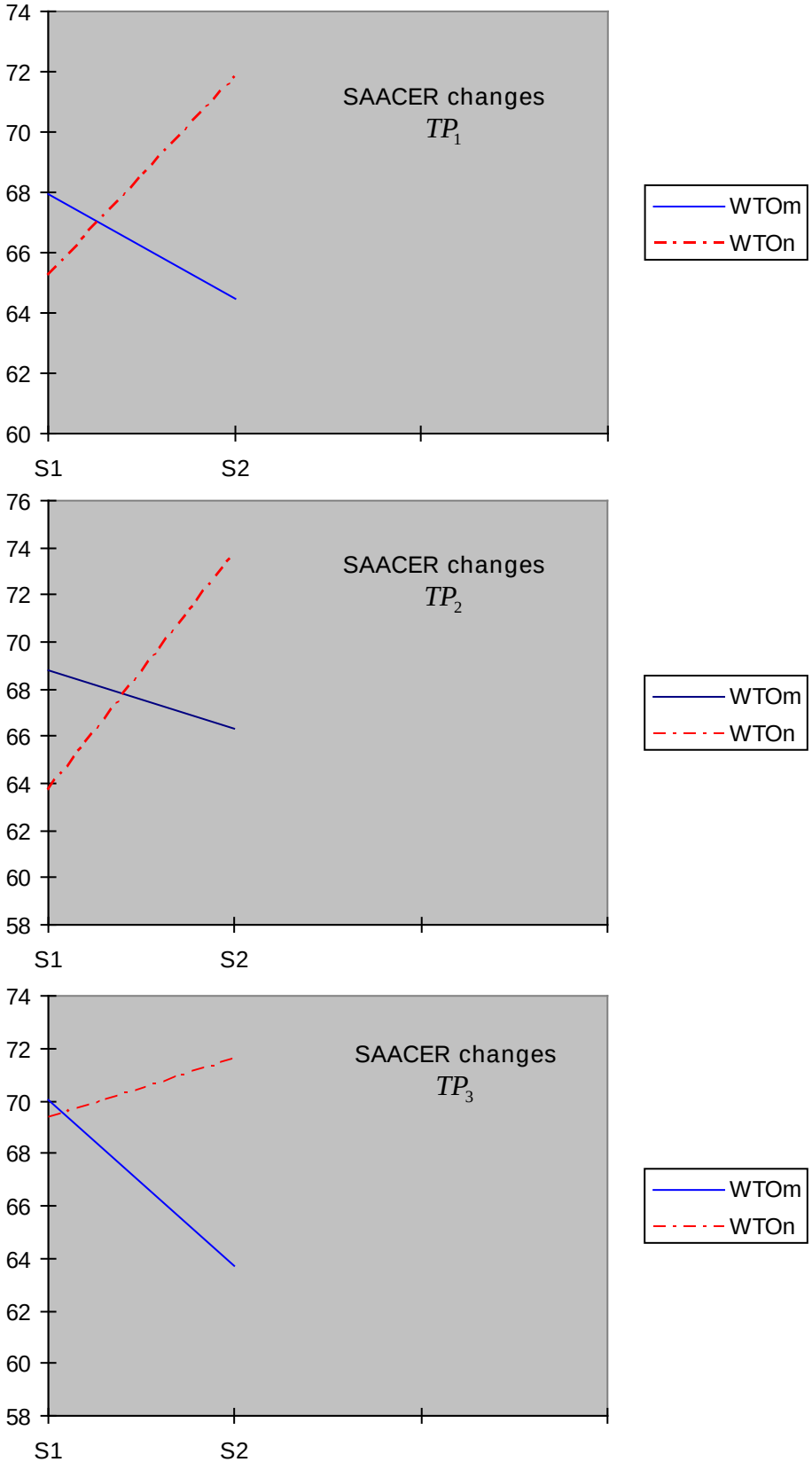
The graphs of different time periods in Figure 5.4 describe the decline and rise of SAACER respectively for WTO member-states and non-member nations between S_1 and S_2 which suggests that the SAACER behaviour has changed as a result of WTO membership in the treatment group[86].

Table 5.7: Simple Aggregate Average CER for WTO member-states and non-member countries between 1985 and 2003

	TP_1		TP_2		TP_3	
	Simple Average CER		Simple Average CER		Simple Average CER	
Countries	1986-1994	1995-2003	1986-1990	2000-2003	1990-1996	1997-2003
Algeria	44.38778	42.61889	44.736	41.9075	45.54143	41.35714
Iran	85.26125	83. 45889	90.4075	84.2725	82.96571	83. 13286
Libya	76.80986	83.04633	71.56	81.0725	80.37329	82.779
Saudi Arabia	*	*	69.466	78.695	*	*
Syria	40.12111	61.87556	28.952	66.91	52.87429	62.56714
Yemen	79.66	88. 15	78.68333	89.6725	85.116	88.13857
MAACER	65.248	71.82993	63.96747	73.755	69.37414	71.59494
Standard deviation	21.262772	19.23382	22.801073	17.338116	18.666557	19.543056
Venezuela	53.82444	58.53444	57.498	68.665	53.74571	61.02857
Congo	83.53444	75.30222	78.708	72.6075	87.36143	72.27
Gabon	78.125	80.285	68.6775	81.57	83.98571	79.94667
Oman	*	*	89.29	71.15	*	*
Egypt	30.57889	11.91667	25.218	8.1825	30.23571	9.038571
Nigeria	93.66375	96.22111	93.6125	95.805	94.69857	96.26429
MAACER	67.94530	64.45189	68.834	66.33	70.00543	63.70962
Standard deviation	25.513396	32.298088	25.142803	30.165057	27.168176	33.139252

[86] This phenomenon will be deeply examined in this chapter utilising the multiple-regression method.

Figure 5.4: Simple Aggregate Average CER before-after time periods for WTO member-states and non-member nations between 1985 and 2003



While WTO member-states have experienced a SAACER decrease in each of the three time periods respectively by –3.50, –2.50 and –6.30, the control group shows a rise of SAACER by +6.58, +10.06 and +2.22 respectively. Since the nations in the treatment and control group were in the same position in terms of CER criterion before 1995, it seems that something happened after this point for WTO member-states which led them to decrease CER, even in the case of rising global price for crude oil during this period of time. Surprisingly, for most of these nations in the treatment group, the daily exports of crude oil between 1995 and 2003 has been more than the petroleum exports from 1986 to 1995 on average, which reveals that the export share of non-primary commodities improved after 1995 (for more information see Appendix 9). However, we should mention that, despite these results, we can see different CER behaviour when we study the disaggregate information in Table 5.7 for each specific country between S_1 and S_2. This finding indicates WTO membership does not automatically lead every nation to a lower CER. Even a negative ΔCER requires to be controlled to find out whether or not a change has occurred as a result of WTO-related effects.

5.2.2.2 CER analysis for WTO member and non-member nations (Mixed Average Method)

Table 5.8 which has been computed based on equation 5.2 shows a mixed average CER and a mixed aggregate average CER (MAACER) in each time period for WTO member-states and non-member countries which can be used to compare them with each other during the similar periods of time. Although here the base of CER computations is different from the previous method the results are very similar and confirm our earlier findings. Again, we can see a downward MAACER trend in every time period for the WTO members, and an upward MAACER trend for non-member nations. This table also

provides information which indicates that the differences of MAACER between these two groups of oil exporters after 1995 might have been the result of the impact of WTO membership on the member-states' economies. Figure 5.5 reveals that MAACER in the non-member countries has risen by +6.34, +9.77 and +2.36, but it has decreased in WTO member-nations in every time period by –4.55, –3.38 and –6.23 respectively.

To sum up, CER investigations have shown the same results in both simple and mixed methods utilising either the before-after or the with-without approach. As we have seen, the changes in CER in every different time period indicated the same trend for each specific test. But here, our main concern is how far these observed changes can be considered as a result of WTO membership. In other words, how are we able to find the effects of uncontrollable and unknown exogenous variables in the environment which could be misleading?

In addition, we study the changes in CER on an aggregate basis which are important, especially when we interpret the results of the study for each specific single nation. In fact, sometimes the behaviour of CER in the previous tests has been different when we have looked at disaggregated data. Although with-without and before-after approaches help us to show the changes of CER on two sides of WTO membership points in different oil exporting nations, we still need to improve the analysis tools based on our research methodology which leads us to use the regression modeling method. But before doing this we concentrate on ETOV as an alternative factor which demonstrates the annual changes of CER in more detail.

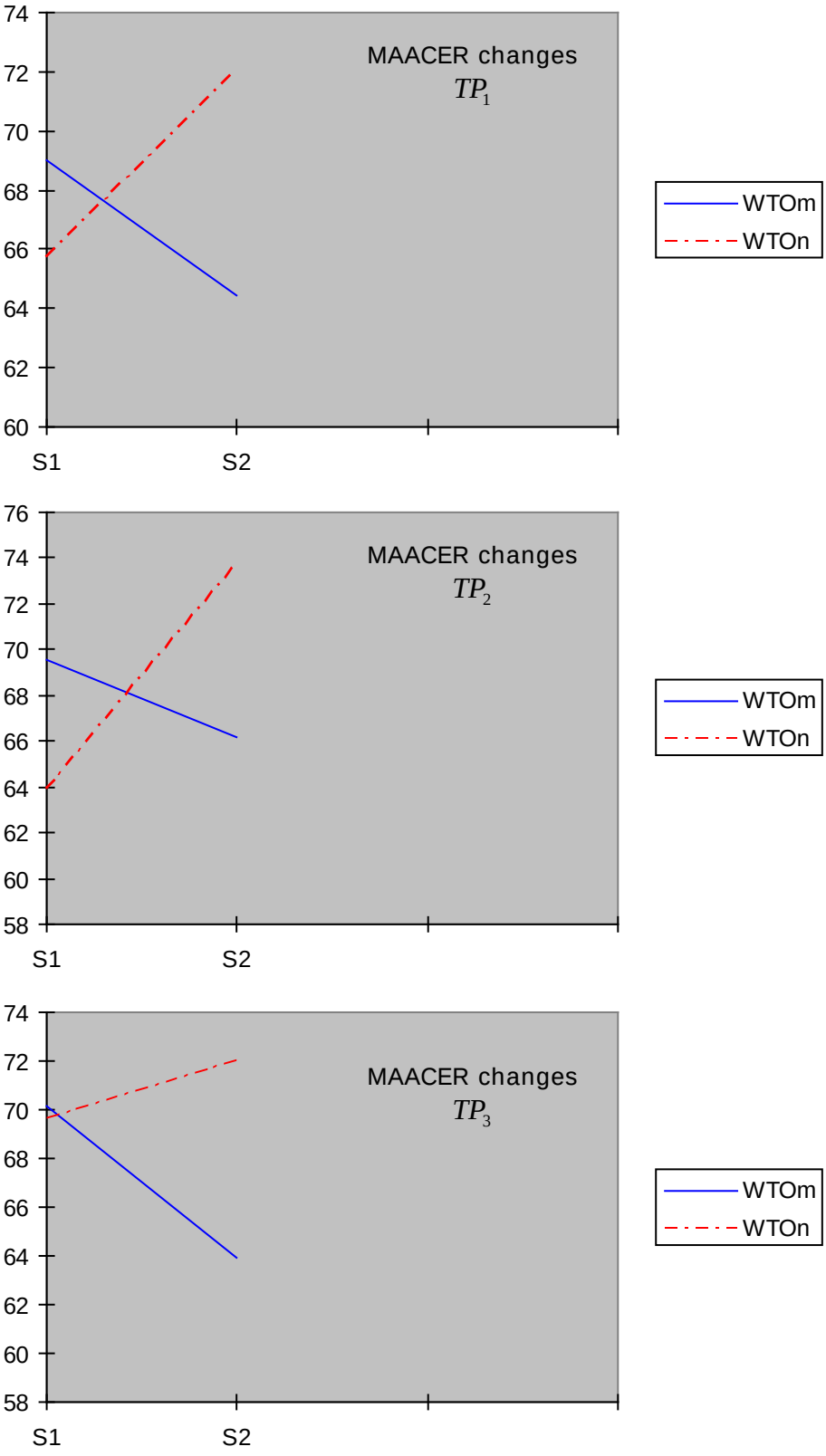
Table 5.8: Mixed Aggregate Average CER for WTO member-states and non-member countries between 1985 and 2003

	TP_1		TP_2		TP_3	
	Mixed Average CER		Mixed Average CER		Mixed Average CER	
Countries	1986-1994	1995-2003	1986-1990	2000-2003	1990-1996	1997-2003
Algeria	44.470298	42.478910	45.0773	42.17973	45.51408	41.69349
Iran	84.50202	83.81456	90.50405	84.31521	83.05546	83.62113
Libya	76.79318	82.67817	71.59494	81.32083	79.83022	82.3166
Saudi Arabia	*	*	69.8148	78.35803	*	*
Syria	43.0077	62.8228	30.19883	66.59665	52.50461	63.65951
Yemen	79.73226	88.38931	76.32703	89.35845	87.1353	88.53305
MAACER	65.70109	72.03675	63.91949	73.68815	69.607934	71.964756
Standard deviation	20.243021	19.221899	22.119964	17.214112	19.141428	19.383413
Venezuela	55.4101	59.54112	61.17106	68.0067	54.09315	61.90778
Congo	83.97475	74.60789	78.53188	72.32947	87.45874	72.24191
Gabon	80.3777	80.4079	69.96857	81.56672	83.80121	80.03059
Oman	*	*	89.31414	71.07977	*	*
Egypt	31.4942	11.3626	24.87394	7.998657	30.49705	8.907544
Nigeria	93.81598	96.38888	93.59324	96.16835	94.85642	96.44814
MAACER	69.014546	64.461678	69.57547	66.19161	70.141314	63.9071928
Standard deviation	25.302655	32.48191	24.962777	30.286237	27.048723	33.2314

5.3 ETOV analysis

In the next two sections, first of all we focus on the amount of ETOV between 1986 and 2003 in WTO member-states in a before-after approach basis then, utilising the with-without method, we compare WTO members with non-member nations in terms of the ETOV factor.

Figure 5.5: Mixed Aggregate Average CER before-after time periods for WTO member-states and non-member nations between 1985 and 2003



To evaluate ETOV in each time period firstly we calculate average XC, XO and TE before and after each specific comparison point. Then, we obtain CER1 and sXC_2 as follows:

$$CER_1 = {XC_1}\big/{TE_1} \times 100$$

$$sXC_2 = CER_1 \times TE_2$$

Utilising these equations we have ETO in two different ways:

$$ETO = -(P_2 - P_4) = -(XC_2 - sXC_2)$$

or $$ETO = nP_2 - nP_4 = XO_2 - sXO_2$$

with regard to:

$$sXO_2 = TE_2 - sXC_2$$

If ETO is negative we compute ETOV based on equation 3.17

$$ETOV = \left(\frac{np_2 - np_4}{np_4} \right) \times 100$$

and if it is positive we use equation 3.18.

$$\oplus ETOV = \left(\frac{-(P_2 - P_4)}{P_4} \right) \times 100$$

5.3.1 ETOV analysis for WTO member-states

As Table 5.9 shows, aggregate average ETOV (AAETOV) has been computed with respect to these equations in three different time periods[87] for WTO member-states.

[87] TP_1 refers to 1986-1994 as ***before*** and 1995-2003 as ***after*** time periods. TP_2 refers to 1986-1990 as ***before*** and 2000-2003 as ***after*** time periods. Also, TP_3 refers to 1990-1996 as ***before*** and 1997-2003 as ***after*** time periods.

Table 5.9: Aggregate Average ETOV for WTO member-states between 1985 and 2003

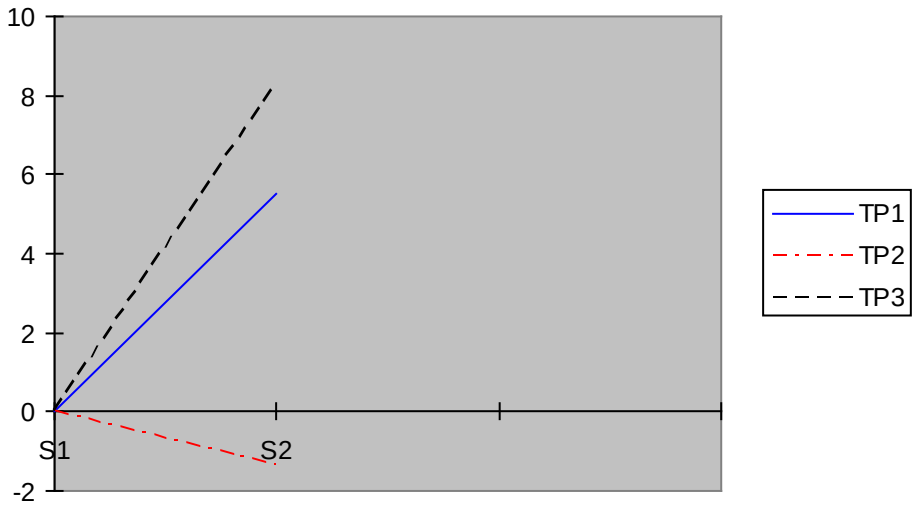
	WTO member-states		
	TP_1	TP_2	TP_3
Nation	ETOV1	ETOV2	ETOV3
Angola	-10.29	-38.46	2.2
Brunei	8.1	-0.5	9.72
Cameroon	-5.92	-14.8	-8.18
Congo	11.15	7.9	17.4
Ecuador	15.07	6.6	5.65
Egypt	63.92	67.84	70.79
Gabon	-0.16	-38.62	4.5
Kuwait	-6.51	-26.4	2.92
Nigeria	-41.61	-40.19	-30.95
Norway	-12.17	-23.15	-5.8
Oman	*	20.42	*
Qatar	24.85	34.61	26.83
UAE	34.34	43.93	29.98
Venezuela	-9.26	-17.6	-17.02
Total	71.51	-18.42	108.04
AAETOV	5.500769	-1.315714	8.310769

According to the above table, it is clear that AAETOV has both positive and negative value between 1986 and 2003 which means that in the second time period (TP_2), in some major oil exporters in the group like Angola, Gabon and Nigeria CER has been noticeably increased between S_1 and S_2. Rising CER, even by a small amount in these nations, may have a considerable impact on ETOV, because based on equation 3.17 this indicator substantially is very sensitive to the value of np_4.[88] Figure 5.6 shows the different amount of ETOV between S_1 and S_2 for this group of nations. As the figure describes, AAETOV has changed between S_1 and S_2 for these nations in each of the three time periods respectively by +5.5, –1.32 and +8.3. To explain these numbers, for

[88] See section 3.3.

instance in the first time period, we can say that WTO member-states have decreased +5.5 percent of supposed crude oil exports on average in S_2.

Figure 5.6: AAETOV before-after time periods for WTO member-states between 1985 and 2003



Despite this, when we focus on the second time period (TP_2), we realise that the AAETOV has been downward between S_1 and S_2. Indeed, these results lead us to concentrate on each single nation at the disaggregate level (instead of a group of countries) which is useful when we interpret the research findings.

5.3.2 ETOV analysis to compare WTO member-states and non-member nations

The impact of WTO membership on member-states can be studied especially when we compare ETOV differences between these member-nations with WTO non-member countries. Referring to the treatment and control groups which we recognised in section 5.2.2, here we calculate ETOV for these two groups of oil exporting nations.

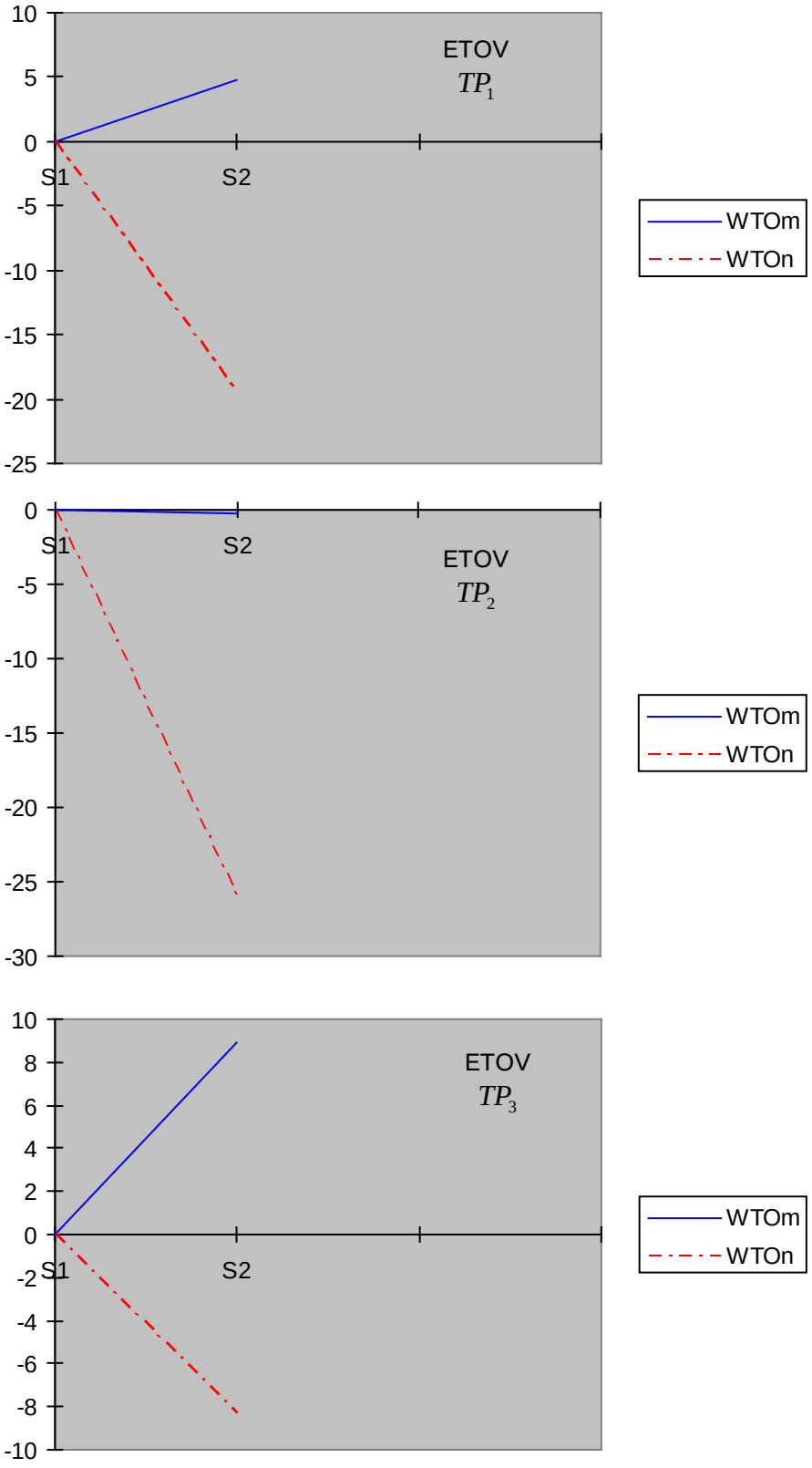
Table 5.10: Aggregate Average ETOV for WTO member-states and non-member countries between 1985 and 2003

WTO non-member nations				WTO member-states			
	TP_1	TP_2	TP_3		TP_1	TP_2	TP_3
Nation	***ETOV1***	***ETOV2***	***ETOV3***	***Nation***	***ETOV1***	***ETOV2***	***ETOV3***
Algeria	4.48	6.43	8.39	Venezuela	-9.26	-17.6	-17.02
Iran	0.81	6.84	-3.34	Congo	11.15	7.9	17.4
Libya	-25.36	-34.24	-12.33	Gabon	-0.16	-38.62	4.5
Saudi Arabia	*	-28.30	*	Oman	*	20.42	*
Syria	-34.77	-52.15	-23.49	Egypt	63.92	67.84	70.79
Yemen	-42.71	-55.05	-10.86	Nigeria	-41.61	-40.19	-30.95
Total	-97.55	-156.47	-41.63	Total	24.04	-0.25	44.72
AAETOV	-19.51	-26.078	-8.326	AAETOV	4.808	-0.0417	8.944

As can be seen from Table 5.10 AAETOV has been calculated for WTO member-states and non-member countries at the same periods of time. Whereas nations in the control group have experienced a negative AAETOV by –19.51, –26.08 and –8.33 respectively in the other group AAETOV in each of the three time periods namely has been +4.81, –0.04 and +8.94. As these computations indicate, the behaviour of the AAETOV factor is slightly different from that of SAACER and MAACER which we have seen in CER analyses in the second time period.

In fact, a quick look at Table 5.10 reveals that while nations such as Nigeria or Venezuela (as WTO member-states) have had negative ETOV in all three time periods during 1986 and 2003 this factor has been positive in Algeria in the control group. These results obviously lead us to do a systematic analysis at the disaggregate level to investigate the research questions, although we can see some differences between WTO member-states and non-member nations in this matter.

Figure 5.7: AAETOV before-after time periods for WTO member-states and non-member nations between 1985 and 2003



5.4 Towards a multiple regression analysis

Before we start interpreting the results in this section, it is beneficial to recall the research questions in section 1.4 to combine what we were looking for and what we have got at this stage of our analysis. In fact, the three questions in part (A) – which we have tried to investigate in the first phase of this research – focus on the matter of export dependency on crude oil in petroleum exporting countries and WTO membership impact on this dependency. To address these questions, the three following aspects can be considered:

1- FTI investigation result:

The results of FTI studies at the *aggregate level* which we have done in section 5.1 show that FTI has changed significantly between S_1 and S_2 in WTO member-states. Our investigations at the disaggregate level also revealed that the degree of trade freedom in all nations has not been upward after the WTO membership point.

2- CER before-after study:

We examined CER in WTO member-states before and after each comparison point between 1986 and 2003 in sections *5.2.1.1* and *5.2.1.2* respectively based on simple and mixed average methods. According to the results, we can see that (at the *aggregate level*) CER, or in other words export dependency on crude oil in these nations in all time periods, has declined between S_1 and S_2. In spite of this, export trade off value (ETOV) analysis could not support CER changes at the aggregate level for the second time period.

3- CER with-without investigation:

In order to compare WTO member-states with non-member countries respectively as treatment and control group we studied CER changes in sections *5.2.2.1* and *5.2.2.2*.

As the results indicate, CER has shown a different behaviour in these two groups which initially were similar before 1995. Indeed, considering the aggregate results, it seems that while CER in the treatment group has decreased, it has increased in the other group after each comparison point. Also, the results of ETOV test in section *5.3.2* show the differences between these groups in more detail.

In brief, with respect to all the tables and figures which we have studied in the *aggregate level* in this chapter we believe that in order to reach reliable results, firstly a complementary investigation should be done at the disaggregate level, because the results which we have got in this chapter just show the behaviour of CER in the treatment and control group and do not necessarily reflect the behaviour of crude oil export ratio in each single country. For example, as we have seen, CER has declined in all time periods in WTO member-states, but at the same time it has increased in Nigeria and Venezuela. Secondly, it should be kept in mind that we can not say yet whether or not the mentioned effects could be considered as the impact of WTO membership in these nations. To do this, we need to utilise the regression method (at the disaggregate level), on which we focus in the next part.

5.5 CER Basic Equation and Effective Factors

With regard to the results of our analyses in the previous section, we have seen that there could be a meaningful change of CER when we compare before and after WTO membership or even when we compare WTO member-states with non-member countries at the aggregate level. Although this conclusion could be generally supported by many studies which have been carried out on the effects of WTO membership or WTO-led trade

liberalisation on industrialisation and growth, there are still two points which need to be addressed:

1- The comparison results have been shown at the aggregate level which means that they may not reveal the real direction of the CER change in every single nation. In the rest of the present chapter we focus on the disaggregate level to investigate each single country, because, as we said earlier, countries are different in terms of their economic, political or other factors, even if they could be categorised into the treatment or control group. With respect to disaggregate findings, we can say that the obvious differences amongst these nations in a variety of aspects indicate that the WTO membership effects on these countries may not be uniform. Therefore, in regression investigations we analyse each WTO member-nation separately.

2- Even if the results of the tests in previous sections show a change in CER, we still need to know whether or not the change has occurred as a consequence of WTO membership.

Referring to equation 3.2 on which we focused in chapter 3, the relationship between independent variables and CER substantially is not linear, so in order to study this factor with a linear regression equation we should use an indirect method. By focusing on XC and TE , we not only are able to investigate the WTO membership effect on the share of crude oil in the export basket, but also, we study the changes in exports – as a whole – after membership of the WTO. Based on this fact, in order to find a meaningful relationship between any of the independent factors with *CER* we study *XC* and *TE* as the two main dependent variables instead of *CER*. Therefore, recognising independent factors which potentially could influence *XC* and *TE* is the initial step to investigating *CER*.

In the case of *XC*, factors such as crude oil production and price are the most important variables. As we said earlier in section 4.1.1, these two traditional factors have appropriately represented the dominant comparative advantage of oil exporting nations for a long time. Indeed, in the real world, the relationship between *XC* as a dependent variable with crude oil production and price as independent factors is very complex. There are many other factors in the oil industry like the production capacity, the level of technology and even skillful human resources which have noticeable effects on oil production. Also, the crude oil price depends on world oil demand which relates to other phenomena such as world oil consumption, or even the weather and sometimes war. Considering this huge network of relationships amongst different factors in the environment, it could be useful to indicate their total effects by focusing on crude oil production and price as two main independent determinants for *XC*.

Based on the above demonstration which indicates a chain of independent-dependent relationships, we focus on TE as the second part of our *CER* analysis. Now, consider a different form of equation 3.1 as follows:

$$TE = XC + XO$$

As the equation shows, *XC* is a part of *TE*, therefore some variables such as crude oil production and price which affect *XC* also could automatically have a considerable impact on *TE*. In addition, in the case of *XO* – which indicates the exports value of all other commodities except crude oil – we believe that in oil exporting nations this part of exports (XO) normally could not compete with *XC* to affect and determine *TE*. In other words, some factors which usually have an impact on *XO* could not affect *TE* without changing *XC*, especially in nations with a high crude oil export ratio. Also, OPEC may

have an indirect[89] impact on *XC* and *TE* in oil exporting nations by affecting oil production, price or even both. While the relationship between OPEC membership and oil production can be expected to be obvious[90] in its member-nations, the effect of OPEC on price has been studied by different researchers who have focused on the behaviour of the organisation and its role as one of the most important energy suppliers in the world. At this point in this research we investigate whether or not WTO as an effective international organisation has meaningfully affected the role of the afore-mentioned traditional factors in oil exporting nations between 1986 and 2003. Indeed, if WTO membership could stimulate industrialisation as a consequence of export diversification with increasing the exports of any products other than crude oil (XO), this process ultimately could decrease the importance of $\mathcal{P}ro$ (crude oil production variable) and $\mathcal{P}ri$ (crude oil price variable) to determine CER.

5.6 WTO membership as a Dummy variable

In section 4.1.1 we pointed out that crude oil production and price effectively influence CER through changing XC and TE. Moreover, in Appendix 6 we indicated high R^2 which can be seen between $\mathcal{P}ro$ and $\mathcal{P}ri$ on the one hand and XC and TE on the other hand in bi-variate relationships in our sample nations. Considering the slope of the regression lines in the Appendix 6, and also with regard to production level which we see in the Appendix 7, it can be shown that the production of crude petroleum on average has decreased after 1995 in Cameroon and Egypt. It can occur either as a result of a

[89] In fact, based on the results of some previous researches such as "*Does OPEC Matter? An Econometric Analysis of Oil Prices"* by Kaufmann (2004) or "*Modelling The World Oil Market*" by Dees *et al.* (2003), OPEC policy could affect crude oil price. Price effects on XC and TE will be analysed completely in each nation separately in this chapter.

[90] OPEC directly specifies the production quotas for its member-states.

meaningful decline in their oil reservoirs or as a result of production limitation in the oil industry in these nations. In fact, the reserves-production ratio (R/P) which we have seen in Table 1.1 indicates that such nations could be crude oil importers in the near future. Therefore, we omit these countries from our analysis in this section because the change of relationship between traditional factors and their export dependency on crude oil is clearly due to the decline in their natural resources, something that could obviously happen in most major oil exporters in the future. In other words, $\mathcal{P}ro$ and $\mathcal{P}ri$ could not be considered as important determinants of XC and TE in these nations during 1986 and 2003. Also, this part of research does not cover Brunei and Gabon because the first country has been a dual exporter (a nation which has just two main products to export) during the period and in the second country the production declined after 1997. The change in crude petroleum importance is seen in these nations when we explain the changes in their export portfolio in the next chapter. For the other ten WTO member-states the unique shape of the regression line slope and also the statistically meaningful regression coefficient (β_1) persuaded us to develop a multiple regression model to investigate any probable effect of WTO membership as a dummy variable.

Before we explain the model, it should be pointed out that we utilise this model for each single country to show the contribution of the WTO on the CER factor in each nation during the past two decades not to predict such effects. In spite of the main target of this modelling, we technically controlled all potential weaknesses of the model based on econometric rules and regulations. The model has been analysed with respect to raw data which have been summarised in Appendix 11. Also, all statistical results have been shown in Tables 5.11 and 5.12.

Table 5.11: The brief results of multiple-regression analysis for selected WTO member-states (before adjustment at 95%)

Nation	*Dep. Variable*	n	R^2	*AdJ.* R^2	R	β_0 Cons	β_1 *pro*	β_2 *pri*	β_3 *WTO*	$t\beta_0$	$t\beta_1$	$t\beta_2$	$t\beta_3$
Angola	XC	18	0.975	0.970	0.988	-4.322	13.456	0.257	0.401	-8.903	5.424	10.993	*1.372*
Angola	TE	18	0.979	0.974	0.989	–3.962	12.983	0.262	0.777	–8.294	5.317	11.393	2.702
Congo	XC	18	0.771	0.811	0.901	-0.510	11.820	0.037	-0.187	*-1.717*	2.616	4.127	*-1.075*
Congo	TE	18	0.886	0.861	0.941	-0.578	13.198	0.045	0.051	*-1.675*	2.518	4.328	*0.251*
Ecuador	XC	18	0.961	0.952	0.980	-1.384	10.395	0.074	-0.124	-7.028	6.941	12.191	*-1.723*
Ecuador	TE	18	0.905	0.885	0.951	-1.420	30.275	0.051	0.851	*-1.695*	4.750	*1.971*	2.784
Kuwait	XC	18	0.925	0.909	0.962	-8.423	11.051	0.396	0.158	-5.773	6.644	7.003	*0.244*
Kuwait	TE	18	0.969	0.963	0.985	-11.283	18.752	0.544	0.684	-7.697	11.223	9.751	*1.046*
Nigeria	XC	17	0.850	0.816	0.922	-17.301	14.240	0.948	1.178	-2.620	*1.355*	5.947	*0.631*
Nigeria	TE	17	0.864	0.833	0.930	-17.247	14.368	0.973	1.061	-2.730	*1.429*	6.380	*0.594*
Norway	XC	18	0.983	0.979	0.991	-16.123	14.167	0.973	0.907	-10.442	7.635	13.773	*0.831*
Norway	TE	18	0.979	0.974	0.989	–11.172	22.589	1.491	5.943	–3.613	6.079	10.534	2.720
Oman	XC	17	0.987	0.984	0.994	-4.965	16.327	0.267	0.387	-12.475	12.574	16.112	*2.059*
Oman	TE	17	0.992	0.990	0.996	–7.339	28.953	0.265	2.353	–14.792	17.887	12.814	10.04
Qatar	XC	18	0.747	0.693	0.864	-3.009	21.971	0.112	-0.915	-2.426	2.503	*2.129*	*-1.013*
Qatar	TE	18	0.878	0.852	0.937	-8.960	49.390	0.287	-1.662	-4.540	3.538	3.437	*-1.157*
UAE	XC	18	0.968	0.962	0.984	-9.677	13.831	0.551	0.208	-7.169	7.770	12.139	*0.495*
UAE	TE	18	0.884	0.859	0.940	-29.168	29.325	1.630	12.699	-2.718	*2.072*	4.519	3.807
Venezuela	XC	18	0.897	0.875	0.947	-5.775	-1.582	0.842	2.950	*-1.490*	*-0.407*	8.111	*2.014*
Venezuela	TE	18	0.948	0.937	0.974	-9.816	12.900	0.786	2.189	-3.007	3.942	8.999	*1.774*

R^2 = Multiple Coefficient of Determination

Adj R^2 = Adjusted $R-square$

R = Multiple Coefficient of Correlation

β_i = Partial Regression Coefficients

$t = t\ ratio$

Table 5.12: The brief results of multiple-regression analysis for selected WTO member-states (Part 1) – after adjustment (continued on next page)

Nation	*Dep. Variable*	n	R^2	*AdJ.* R^2	R	β_0 Cons	β_1 ***pro***	β_2 ***pri***	β_3 ***WTO***	$Se\beta_0$	$Se\beta_1$	$Se\beta_2$	$Se\beta_3$
Angola	XC	18	0.972	0.968	0.986	–4.732	15.984	0.258	---------	0.394	1.710	0.024	----------
Angola	TE	18	0.979	0.974	0.989	–3.962	12.983	0.262	0.777	0.478	2.442	0.023	0.287
Congo	XC	15	0.817	0.787	0.904	–0.469	8.208	0.046	---------	0.200	2.057	0.011	----------
Congo	TE	18	0.885	0.870	0.941	–0.649	14.364	0.045	---------	0.187	2.347	0.010	----------
Ecuador	XC	18	0.952	0.946	0.976	–1.154	8.722	0.071	---------	0.154	1.213	0.006	----------
Ecuador	TE	18	0.852	0.833	0.923	–3.002	41.777	0.077	--------	0.742	5.843	0.029	---------
Kuwait	XC	18	0.924	0.914	0.961	–8.632	11.314	0.402	---------	1.144	1.225	0.049	----------
Kuwait	TE	18	0.967	0.963	0.983	–12.183	19.888	0.571	---------	1.191	1.275	0.051	----------
Nigeria	XC	17	0.846	0.823	0.920	–20.148	18.856	0.957	---------	4.717	7.377	0.155	----------
Nigeria	TE	17	0.861	0.841	0.928	–19.807	18.523	0.981	---------	4.505	7.046	0.148	----------
Norway	XC	18	0.982	0.979	0.991	–16.856	15.440	0.978	---------	1.254	1.036	0.070	----------
Norway	TE	18	0.979	0.974	0.989	–11.172	22.589	1.491	5.943	3.092	3.716	0.142	2.185
Oman	XC	17	0.985	0.983	0.992	–5.729	17.473	0.291	---------	0.406	1.400	0.014	----------
Oman	TE	17	0.994	0.992	0.997	–7.934	30.332	0.273	2.278	0.483	1.481	0.018	0.201
Qatar	XC	18	0.729	0.692	0.854	–2.095	14.175	0.118	---------	0.853	4.224	0.052	----------
Qatar	TE	18	0.867	0.849	0.931	–7.300	35.226	0.298	---------	1.371	6.790	0.084	----------
UAE	XC	18	0.968	0.963	0.984	–9.986	14.132	0.559	---------	1.167	1.630	0.041	----------
UAE	TE	18	0.764	0.733	0.874	–48.022	47.752	2.158	---------	13.120	18.324	0.459	----------
Venezuela	XC	18	0.896	0.882	0.947	–7.153	---------	0.850	2.481	1.834	----------	0.099	0.882
Venezuela	TE	18	0.936	0.928	0.968	–14.199	17.458	0.852	---------	2.281	2.167	0.085	----------

R^2 = Multiple Coefficient of Determination

Adj R^2 = Adjusted $R-square$

R = Multiple Coefficient of Correlation

β_i = Partial Regression Coefficients

Se = Standard Deviation

Table 5.12: The brief results of multiple-regression analysis for selected WTO member-states (Part 2) – after adjustment

Nation	*Dep. Variable*	df_1	df_2	$t\beta_0$	$t\beta_1$	$t\beta_2$	$t\beta_3$	F	*ESS*	*RSS*	*DW*	*CI*	*K*	*dL*	*dU*	*4 – DW*
Angola	XC	2	15	–12.015	9.348	10.693	-------	259.590	67.158	1.940	1.604	12.024	2	0.805	1.259	--------
Angola	TE	3	14	–8.294	5.317	11.393	2.702	217.437	77.178	1.656	2.260	15.624	3	0.708	1.422	1.740
Congo	XC	2	12	–2.338	3.991	4.372	-------	26.823	1.032	0.231	1.371	12.506	2	0.700	1.252	--------
Congo	TE	2	15	–3.471	6.121	4.530	-------	57.839	3.010	0.390	1.913	11.069	2	0.805	1.259	--------
Ecuador	XC	2	15	–7.492	7.192	11.664	-------	150.324	3.330	0.166	1.626	13.899	2	0.805	1.259	--------
Ecuador	TE	2	15	–4.044	7.150	2.650	-------	43.269	22.248	3.856	1.630	13.899	2	0.805	1.259	--------
Kuwait	XC	2	15	–7.546	9.239	8.258	-------	91.663	151.137	12.366	1.448	11.405	2	0.805	1.259	--------
Kuwait	TE	2	15	–10.232	15.602	11.256	-------	219.550	392.256	13.400	*2.751*	11.405	2	0.805	1.259	1.249
Nigeria	XC	2	14	–4.271	2.556	6.156	-------	38.316	465.893	85.114	1.566	19.607	2	0.772	1.255	--------
Nigeria	TE	2	14	–4.396	2.629	6.609	-------	43.294	480.175	77.638	1.660	19.607	2	0.772	1.255	--------
Norway	XC	2	15	–13.446	14.905	14.021	-------	403.452	1075.909	20.001	1.738	11.160	2	0.805	1.259	--------
Norway	TE	3	14	–3.613	6.079	10.534	2.720	213.689	3500.052	76.436	1.678	14.916	3	0.708	1.422	--------
Oman	XC	2	14	–14.097	12.478	21.474	-------	461.373	48.084	0.730	1.271	16.961	2	0.772	1.255	--------
Oman	TE	3	13	–16.418	20.486	15.276	11.31	681.702	117.861	0.749	*1.412*	19.033	3	0.672	1.432	--------
Qatar	XC	2	15	–2.457	3.355	2.255	-------	20.137	24.881	9.267	*2.957*	11.949	2	0.805	1.259	1.043
Qatar	TE	2	15	–5.326	5.188	3.550	-------	48.813	155.804	23.939	1.830	11.949	2	0.805	1.259	--------
UAE	XC	2	15	–8.556	8.671	13.707	-------	225.261	217.620	7.246	1.990	17.072	2	0.805	1.259	--------
UAE	TE	2	15	–3.660	2.606	4.703	-------	24.330	2970.826	915.790	*0.815*	17.072	2	0.805	1.259	--------
Venezuela	XC	2	15	–3.900	----------	8.581	2.814	64.658	361.208	41.898	2.497	11.072	2	0.805	1.259	1.503
Venezuela	TE	2	15	–6.225	8.056	10.054	-------	110.472	530.003	35.982	1.616	13.388	2	0.805	1.259	--------

df = Degree of Freedom
$t = t\ ratio$
$F = F\ ratio$
ESS = Explained Sum of Squares
RSS = Residual Sum of Squares
$D.W$ = Durbin-Watson
CI = Condition Index
K = Number of Regressors
d_L = Durbin-Watson lower bound
d_U = Durbin-Watson upper bound

In the rest of this section, we explain the method by which we constructed Table 5.12 [91] with very interesting results. With respect to the linear relationship between the independent and dependent variables which we have found in the bi-variate level, we employ ordinary least squares (OLS) to fit a line whose general equation for these countries is of the form:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

where, $\mathcal{P}ro = X_1$, $\mathcal{P}ri = X_2$, $\mathcal{WTO} = X_3$ and ε is Stochastic Disturbance or Error Term and Y could be either XC or TE in this equation. We have examined this general equation for each nation based on their specific data in Appendix 11. Table 5.12 shows XC and TE relationships – after the adjustment of our findings in Table 5.11 at the 95% confidence interval – with independent variables for each country considering the highest possible R^2 which has occurred between 1986 and 2003.

There are some important points which should be considered about this table:

1- All signs of independent variables (X_1, X_2 and X_3) in the table conveniently conform to our expectations.

2- All partial coefficients of independent variables (β_1, β_2 and β_3) which have been shown in the table are statistically significant at 95 percent level of confidence.

3- The amount of *R-square* (R^2) and also *Adjusted R-square* are noticeably very high.

[91] All the statistical analyses in these tables have been done by SPSS 13 software. Table 5.11 has been constructed without adjustments and only shows the raw relationship between dependent and independent variables.

4- The table shows the amount of (F) for each equation to indicate goodness of fit. Although the amount of (F) is different amongst nations, it is generally high.

5- Autocorrelation has been controlled by the Durbin-Watson (*D.W*) d-test (based on the Savin and White table for models with an intercept) and as the results show for 16 out of 20 equations in the table there is no autocorrelation and for 4 others the amount of the d-tests are in the indecisive zone very near to the acceptable area. The zones have been found based on significance points of d_L and d_U at 0.01 level of significance.

6- To control Multi-Collinearity, we computed a Condition Index (*CI*) for each separated equation and based on the results there is no equation with a *CI* more than 20 in this table.[92]

7- The *Spurious Regression* as a potential problem which could occur in *Time Series* data has been controlled by the rule which has been suggested by Granger and Newbold (1974). According to their findings a very high R^2 combined with a very low *D.W* which results $R^2 \rangle D.W$ could conveniently indicate the *Spurious Regression* problem. As Table 5.12 shows such a situation did not happen for our regression equations.

With regard to the controlling procedures which focus on the modelling of the relationship amongst different variables to predict reliable outcomes, these equations can be employed to show the effects of WTO membership in these nations between 1986 and 2003. Therefore, at this point we emphasise what this table can tell us about the WTO impacts on CER.

[92] According to Gujarati (1995) Condition Index more than 30 might potentially create problems for the regression model as a result of Multi-Collinearity.

To interpret the findings from Table 5.12 we refer to the partial regression coefficients for our main independent variables. We categorise the results as follows:

1- Based on the table it can be revealed that *Pro* (crude oil production variable) has been an effective factor to determine XC and TE in all nations during the period of study except for one case which is XC determination for Venezuela. It should be kept in mind that this means *Pro* impact was statistically meaningful at 95 percent level of confidence in all nations except Venezuela.

2- *Pri* (crude oil price variable) has been significant at 95 percent level of confidence for both XC and TE in all cases.

3- *WTO* behaviour as a dummy variable was very interesting and totally different among these ten nations. It did not appear in six countries including Congo, Ecuador, Kuwait, Nigeria, Qatar and UAE. This result tells us that the *Pro* and *Pri* relationship with XC and TE before and after WTO membership in these nations were the same. In the rest of the countries WTO has behaved in two different ways. For three nations including Angola, Norway, and Oman, it appeared in TE equation and does not work as an XC determinant. In fact it has had a *deterrent impact* on CER in these countries. In contrast, this dummy variable has appeared in the XC determination model for Venezuela. Surprisingly it seems that the membership of the WTO in this country has been accompanied with an increase in the share of crude oil in the nation's export basket. This latter result of trade liberalisation which has previously been observed in Venezuela has been supported by a study carried out by Mommer in 1998 under the name of "The New Governance of Venezuelan Oil".

5.7 Chapter Summary

In this chapter we have shown how FTI as the trade liberalisation proxy has changed after 1995 in oil exporting countries in WTO member-states. Our investigations confirm that WTO membership supported trade liberalisation in these nations at the aggregate level. In addition, we studied CER which has changed in both treatment and control groups into two different ways at the aggregate level. To support our findings we used a linear regression analysis at the disaggregate level which revealed that the impact of WTO membership on CER has not been the same in oil exporters between 1986 and 2003. Although the results we have obtained in the first phase of this research could clearly address the three parts of the question (A), it could not clarify the changes in the export portfolio before and after WTO membership point, because in this phase of the study we expected that XO, which contains a variety of products rather than crude petroleum, represents just one commodity. This type of assumption may conveniently show how a product like crude oil can be a vital part of a nation's export basket but at the same time it prevents us from knowing more about other commodities in the country's export portfolio. In the second phase of this study we focus on the export basket of oil exporting nations in more detail.

Chapter 6

Export Portfolio Analysis

Introduction

In the previous chapter we investigated the relationship between WTO membership as a dummy variable and crude oil exports (XC) and total exports (TE) as two main dependent variables to measure how the oil exporting countries' dependency on crude oil exports may be affected by WTO membership. It is clear that any meaningful change in export dependency on crude oil directly can not be considered as a change in the export portfolio of the nation. In other words, reducing the crude oil export ratio (CER) in these countries can support the development process when we observe considerable diversification in the countries' export basket after their membership in the WTO. Although the methodology which has been utilised in the previous chapter can measure changes in the crude oil share in the export portfolio, it can not measure the real change in the exports of other commodities (XO), which we need to know as part of the export portfolio analysis.

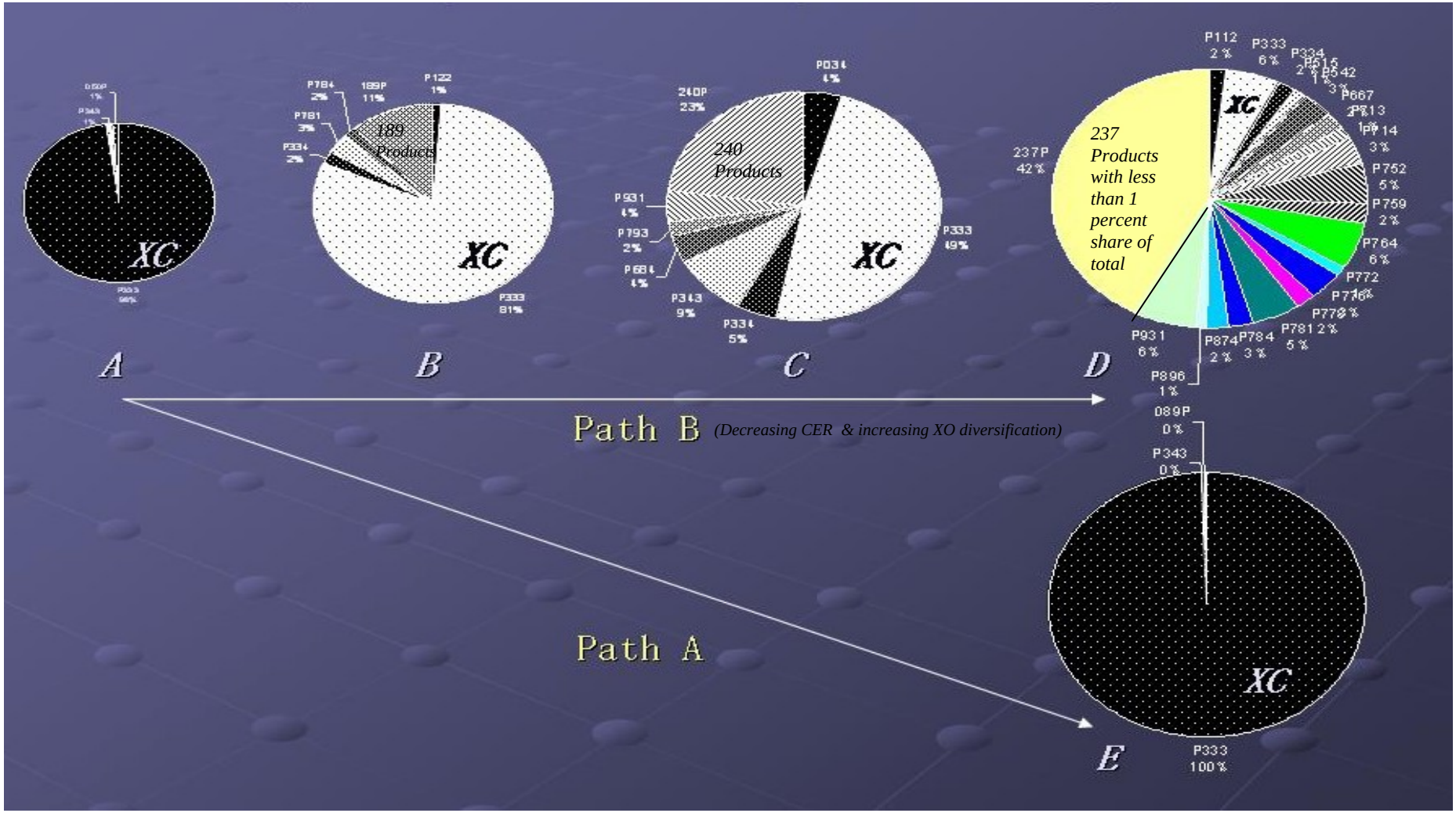
In this chapter, we analyse export portfolio changes between base and terminal time periods in oil exporting nations. The present chapter consists of five parts. The first part provides an introduction to the subsequent statistical analysis. In the second section, we investigate the top ten exporting commodities rankings in the export portfolio in each country both in the base and terminal time periods to show what really happened in the

product level in these nations between two periods of time. In part three, we measure changes in the export structure by comparing the distribution of the revealed symmetric comparative advantage (RSCA) for petroleum exporting nations at two points in time before and after 1995. Section four combines the results of our analysis in two complementary phases of the present research. Finally, in the last section of this chapter we briefly point out the findings which can be considered as a complement of CER analysis in the previous chapter.

6.1 Export Portfolio Analysis and Important Considerations

As we said earlier in this research, one of the most important motives behind the WTO membership of developing nations has been economic growth. To see the signals of industrialisation as the first gate of economic development in oil exporters, we not only investigate the relationship between WTO membership and export dependency on crude oil but also we study export diversification after WTO membership in these countries. With regard to Figure 6.1, reducing the crude oil share of total exports in a nation can only be an initial step towards industrialisation which is unlikely to be effective in the absence of export diversification. Therefore, export portfolio analysis which measures how the combination of different products and their share of total in the export basket have changed in these countries during the analysed period is a vital step in the present research. Obviously, in order to study the export portfolio changes between base and terminal time we should investigate XO in more detail because for some nations it could be a combination of more than two hundred different products.

Figure 6.1: Possible scenarios for export portfolio changes and path analysis in petroleum exporting nations, based on SITC product code



In this phase of the present research the main aim is to investigate whether or not the export portfolio has become more diversified in petroleum exporting nations after their membership in the WTO. To assess the degree of diversification in these countries' export basket – which may have occurred over the 1988 to 2002 period – we utilise the UNCTAD database[93] which can be found at:

http://www.unctad.org/Templates/Page.asp?intItemID=1890&lang=1

The data for oil exporting nations in this data source has been prepared at the 3-digit SITC level (see Appendix 12).

In order to analyse export diversification based on our explanation in section 3.5, we measure revealed symmetric comparative advantage which is calculated for the exports to the international market of each industry and country included in the analysis.[94] Based on this, we use the UNCTAD export figures directly to calculate RSCA which is needed for doing Galtonian regression analysis (for more information see Taylor-2003). Also, in order to measure the real export ability of these nations we ignore the exports of every commodity which has been less than 1,000,000 US dollars in both base and terminal time periods. In other words with regard to the three-year time interval which we have considered for the first time period (from 1988 to 1990) and the second (between 2000 and 2002), products with annual exports of less than 330,000 US dollars have been omitted from our calculations.[95] Doing this adjustment can be helpful in two different

[93] Export portfolio analysis has not been done for Kuwait and UAE because of data inconsistency.

[94] With respect to the main exportable products which usually are the same in these selected oil exporting nations, we suppose the rest of the world as an international market for these countries and ignore the exports amongst themselves.

[95] The cumulative share of total for the omitted items for all nations at maximum level has been less than 1 percent except for Gabon and Yemen in S2 which has been near 2 percent in this adjustment.

ways: Firstly, the total number of exportable commodities in a nation might be sometimes utilised as a factor to indicate the country's producing and export power but this type of measurement can be misleading when the amount of exports, both in terms of value or volume, is negligible.

Table 6.1: Number of exportable products before-after adjustment in both base and terminal time periods for selected oil exporting nations

Nation		Algeria	Angola	Brunei	Cameroon
Stage					
Before ***ADJ****	S1	152	-----	206	216
	S2	209	194	197	216
After ***ADJ***	S1	74	-----	35	67
	S2	73	27	51	49
Nation		Congo	Ecuador	Egypt	Gabon
Before ***ADJ***	S1	124	161	220	134
	S2	181	214	224	186
After ***ADJ***	S1	25	60	126	29
	S2	35	129	140	35
Nation		Iran	Libya	Nigeria	Norway
Before ***ADJ***	S1	197	76	184	236
	S2	226	186	171	236
After ***ADJ***	S1	73	30	57	207
	S2	170	37	49	206
Nation		Oman	Qatar	Saudi A.	Syria
Before ***ADJ***	S1	188	191	233	192
	S2	215	215	235	114
After ***ADJ***	S1	89	50	172	73
	S2	143	75	196	79
Nation		Venezuela	Yemen		
Before ***ADJ***	S1	226	171		
	S2	230	193		
After ***ADJ***	S1	167	29		
	S2	178	51		

** **ADJ** = adjustment*
S1= 1988-1990
S2=2000-2002

For example, as Table 6.1 shows, the number of exportable products for Cameroon and Norway are very close to each other for both the first period (S1) and for the second (S2). On the other hand, when we omit the insignificant commodities in these nations – as the table indicates – the number of commodities in the export basket for Norway is at least three times more than the number of exportable products for Cameroon in both time periods. These big differences for the number of exportable products between before and after adjustments also can be seen in other oil exporting nations in this research.

Secondly, the adjustment can increase the quality of Galtonian regression results by reducing the number of digits in the calculation process. Indeed, from considering the $RSCA_{ij}$ formula it is clear that when the exports value of a specific product in a nation is very low, the amount of $X_{ij}/\sum_i X_{ij}$ would be near zero (see section 1.5). Also, as a result of this latter fact, RCA_{ij} approximately tends to be zero which means that for most of these relatively unimportant products which have been negligible in both sides before and after the comparison point, the amount of $RSCA_{ij}$ would be minus one (-1). Therefore, they can not really affect the results of the regression in this method.

6.2 Top Ten Products Rank Analysis

In order to start our export portfolio analysis, we calculated the changes in the rankings of top ten exportable products between the first (1988-1990) and the second (2000-2002) time periods in Table 6.2. In this section, we summarise key findings which indicate how the export portfolio has changed in oil exporting nations during the last two decades:

Table 6.2: Top Ten Exporting Products Ranking

Ranking	*Country*	*Algeria*		*Angola*		*Brunei*		*Cameroon*		*Congo*		*Ecuador*	
	Time period	88-90	00-02	88-90	00-02	88-90	00-02	88-90	00-02	88-90	00-02	88-90	00-02
1st CC*		333	341	333	333	333	333	333	333	333	333	333	333
%		46.41	42.30	85.62	88.57	47.09	45.47	45.42	46.70	78.87	72.16	44.99	39.31
2nd CC		341	333	277	667	341	341	071	248	247	334	057	057
%		28.43	40.57	11.21	7.85	44.51	41.73	10.23	12.34	8.48	6.86	15.82	18.61
3rd CC		334	334	334	334	334	793	072	072	334	247	036	037
%		20.80	13.79	2.26	1.95	5.35	2.60	9.56	8.97	3.64	5.15	14.57	5.73
4th CC		686	335	341	036	011	334	247	684	634	341	071	036
%		0.31	0.87	0.34	0.45	0.39	1.66	6.17	5.06	2.45	4.38	6.33	5.60
5th CC		112	522	071	341	713	845	263	334	248	667	072	292
%		0.23	0.50	0.22	0.37	0.26	1.26	3.59	5.01	1.21	3.27	4.75	4.73
6th CC		671	672	034	034	846	846	248	263	667	689	334	334
%		0.21	0.22	0.17	0.11	0.22	1.22	2.32	4.84	1.20	1.70	3.65	3.70
7th CC		511	511	661	931	749	842	661	071	287	248	034	072
%		0.19	0.21	0.10	0.09	0.21	0.72	1.75	4.12	1.16	1.35	1.88	1.87
8th CC		723	674	036	273	874	844	634	057	061	287	081	034
%		0.19	0.15	0.03	0.07	0.17	0.67	1.25	2.63	1.05	1.23	1.38	1.75
9th CC		672	562	287	714	792	843	232	247	036	061	037	781
%		0.17	0.13	0.01	0.07	0.13	0.65	1.21	2.10	0.16	0.72	1.17	1.34
10th CC		674	611	282	874	723	792	652	634	874	071	292	335
%		0.16	0.09	0.01	0.06	0.11	0.46	0.91	2.09	0.10	0.46	0.56	1.11
NOEC**		142	199	na	184	196	187	206	206	114	171	151	204
%		2.90	1.17	0.03	0.41	1.56	3.56	17.59	6.14	1.68	2.72	4.90	16.25

* CC: Commodity ***SITC*** Code (see Appendix 12)

** NOEC: Number of Other Exported Commodities in the ranking (Total number of exportable products minus 10)

Table 6.2: Top Ten Exporting Products Ranking (continued)

Ranking	*Country*	*Egypt*		*Gabon*		*Iran*		*Libya*		*Nigeria*		*Norway*	
	Time period	88-90	00-02	88-90	00-02	88-90	00-02	88-90	00-02	88-90	00-02	88-90	00-02
1st CC*		333	334	333	333	333	333	333	333	333	333	333	333
%		20.40	33.91	70.83	81.57	90.64	84.71	81.87	80.57	93.31	96.08	30.90	45.90
2nd CC		651	333	247	247	659	659	334	334	072	341	341	341
%		16.75	9.12	11.80	9.94	3.05	2.45	11.63	12.54	2.48	1.53	8.58	12.23
3rd CC		684	931	287	634	057	057	511	341	931	793	684	931
%		10.02	5.39	9.82	2.04	2.24	2.02	2.89	1.85	1.33	0.96	7.10	4.32
4th CC		334	263	524	334	334	341	341	511	233	335	793	034
%		9.40	4.04	2.96	1.79	1.27	1.17	1.02	0.97	0.48	0.37	4.59	4.31
5th CC		263	562	247	287	211	672	512	512	562	651	034	684
%		8.89	2.18	1.18	1.65	0.47	0.67	0.87	0.82	0.35	0.21	3.78	3.97
6th CC		652	684	634	248	682	335	562	562	232	812	641	334
%		3.52	2.01	1.13	0.81	0.23	0.56	0.33	0.64	0.19	0.20	3.35	3.46
7th CC		057	323	036	036	075	054	523	672	223	048	334	793
%		2.75	1.96	0.77	0.39	0.22	0.31	0.28	0.50	0.17	0.17	3.20	2.41
8th CC		054	651	334	792	274	682	287	583	341	291	671	641
%		2.48	1.86	0.69	0.25	0.20	0.29	0.16	0.40	0.15	0.08	2.21	1.20
9th CC		845	661	061	122	037	851	522	335	036	653	683	035
%		1.72	1.84	0.29	0.21	0.19	0.28	0.13	0.32	0.12	0.06	2.14	1.00
10th CC		821	672	931	842	287	334	661	673	081	553	583	764
%		1.30	1.77	0.15	0.10	0.17	0.28	0.09	0.26	0.12	0.04	1.54	0.97
NOEC**		210	214	124	176	187	216	66	176	174	161	226	226
%		22.77	35.92	0.38	1.25	1.32	7.26	0.73	1.13	1.30	0.30	32.61	20.23

* CC: Commodity ***SITC*** Code (see Appendix 12)

** NOEC: Number of Other Exported Commodities in the ranking (Total number of exportable products minus 10)

Table 6.2: Top Ten Exporting Products Ranking (continued)

Ranking	*Country*	*Oman*		*Qatar*		*Saudi A.*		*Syria*		*Venezuela*		*Yemen*	
	Time period	88-90	00-02	88-90	00-02	88-90	00-02	88-90	00-02	88-90	00-02	88-90	00-02
1st CC*		333	333	333	333	333	333	333	333	333	333	333	333
%		88.67	72.04	70.34	44.39	68.42	79.94	30.47	68.10	60.14	63.95	76.33	91.96
2nd CC		781	341	334	341	334	334	334	334	334	334	334	335
%		1.93	7.02	6.66	42.11	13.83	9.13	12.15	6.87	18.04	18.41	9.37	1.53
3rd CC		334	781	583	334	341	583	553	931	684	684	036	334
%		1.35	3.29	5.95	3.41	4.27	1.77	10.44	4.71	6.21	2.84	1.95	1.30
4th CC		682	122	673	583	583	512	653	263	281	671	071	034
%		1.01	2.70	5.28	2.53	3.04	1.61	9.97	3.76	1.98	1.28	1.69	1.19
5th CC		792	784	562	562	512	511	001	001	674	322	341	071
%		0.86	1.81	2.75	1.98	1.75	1.14	4.90	2.94	1.12	0.85	1.37	0.48
6th CC		784	334	341	673	511	516	845	054	971	674	931	057
%		0.49	1.00	2.56	1.64	1.31	0.98	3.81	2.05	0.86	0.80	1.25	0.45
7th CC		931	782	511	843	522	562	263	057	673	672	211	036
%		0.39	0.76	1.61	0.69	0.81	0.41	3.59	1.76	0.78	0.71	1.03	0.38
8th CC		723	022	582	522	041	792	655	651	672	583	335	211
%		0.38	0.52	1.06	0.58	0.64	0.33	3.17	1.33	0.54	0.66	0.97	0.36
9th CC		036	653	522	842	335	522	054	075	678	516	057	054
%		0.34	0.50	0.66	0.51	0.37	0.27	2.70	1.14	0.47	0.63	0.80	0.21
10th CC		941	792	781	781	562	642	846	041	583	512	122	554
%		0.34	0.49	0.63	0.26	0.34	0.23	2.03	0.72	0.45	0.50	0.65	0.20
NOEC**		178	205	181	205	223	225	182	104	216	220	161	183
%		4.24	9.87	2.50	1.90	5.22	4.19	16.77	6.62	9.41	9.37	4.59	1.94

* CC: Commodity ***SITC*** Code (see Appendix 12)

** NOEC: Number of Other Exported Commodities in the ranking (Total number of exportable products minus 10)

1- Crude petroleum still remains the number one exportable commodity in the export portfolio in all these nations except Algeria and Egypt. As we said earlier in this research, since this product is a type of non-renewable natural resource, substituting that with some other exportable commodities, especially non-primary products, can considerably decrease the risk of international trade for these countries. This has not been observed in most of oil exporting nations in the second time period.

2- The percentage of other exportable commodities (OEC)[96] in the export basket in nations like Algeria, Angola, Brunei, Congo, Gabon, Libya, Nigeria, Qatar and Yemen has been less than 5 percent in both the above-mentioned time periods. In most of these countries the share of three top exportable commodities in the export portfolio has been approximately more than 90 percent (in value). Although the importance of these three top commodities did not change considerably between the two time periods, the combination of the products has changed.

3- The importance of OEC in percentage terms has increased in Ecuador, Egypt, Iran and Oman in the second time period.

4- The importance of OEC in percentage terms has decreased in Norway, Syria and Cameroon in 2000-2002 in comparison with the first time period. Although the number of other exportable products decreased in Norway in the second period of time, this country still has the biggest number of exportable products amongst oil exporting nations.

[96] Products with rankings higher than 10 in the export portfolio

5- Based on Table 6.2 it is clearly possible to say that these nations are still mainly primary product exporters. A short review of major exportable products reveals that the export basket in oil exporting nations was dominated by primary products such as crude petroleum, aluminum, fresh foods, fruit and textile, not only in the period between 1988 to 1990 but also in the second time period from 2000 to 2002. Amongst these countries we have only seen a considerable jump in the export of non-primary products in the second period of time in Egypt (when we categorise all refined oil products as non-primary commodities).

In sum, with respect to the results of the analysis of the top ten commodities, there is no considerable difference between the exportable products portfolio in the two compared periods of time in both WTO member-states and WTO non-member nations. Therefore, we conclude that WTO membership may not be a factor which has affected the export portfolio in these nations during the period of our investigation.

6.3 Adjusted 18 nations' Portfolio Analysis

As we said earlier in this research, the following Galtonian linear regression model which we explained in section 3.5 could be used to analyse the change of export portfolio between two points in time.

$$RSCA_{ij,t1} = \alpha_j + \beta_j RSCA_{ij,t0} + \varepsilon_i$$

In this model *RSCA* indicates revealed symmetric comparative advantage. The above equation compares the distribution of the export specialisation structure in base and terminal time periods and we interpret the equation based on the value of β and

coefficient of determination (R^2). Obviously, with respect to this equation we can only study the change and not the related causes.

The empirical results which we have obtained from the $RSCA_{ij}$ analysis for 18 oil exporting nations[97] are summarised in Table 6.3. To start the interpretation of the results we refer to the criteria which we pointed out in section 3.5. As the table shows, there is no country with a meaningful negative value of β, which indicates that the pattern of export has not reversed in these nations during the time periods between 1988 and 2002.

For Angola, Brunei, Congo, Gabon, Libya, Nigeria and Yemen at the 95 percent confidence interval the hypothesis of β equal to zero can not be rejected. Therefore, with regard to the criteria which we introduced in section 3.5, the export pattern between the terminal and base time periods has changed randomly in these countries. This latter phenomenon especially occurs in combination with the low values of R.

The table shows that the amounts of R which vary from zero to one are mostly very low for all the seven above-mentioned nations and they are 0.089, 0.130, 0.165, 0.064, 0.250, 0.012 and 0.080 for these countries respectively. Based on the calculation for the values of β we can say that there is no relationship between the export patterns from the first period to the second. In other words, the new export patterns just show a range of differences which have occurred in the export portfolio of these countries with no specific direction during the time period from 1988 to 2002.

[97] Export portfolio analysis has not been done for Kuwait and UAE because of data inconsistency.

Table 6.3: Regression Estimates for Selected Oil exporting nations

Country	α	β	R	R^2	$1-\beta$	$1-R$	$\lvert\beta\rvert/\lvert R\rvert$	L_{95}	U_{95}	N
Algeria	-0.486 (-8.441)	0.326 (4.153)	0.380	0.145	0.674	0.620	0.857894736	0.170	0.482	104
Angola	-0.645 (-3.920)	-0.088 (-0.479)	0.089	0.008	-----	0.992	0.988764044	-0.461	0.286	31
Brunei	-0.297 (-2.634)	-0.149 (-1.005)	0.130	0.017	-----	0.870	1.146153846	-0.445	0.148	61
Cameroon	-0.277 (-3.393)	0.437 (3.366)	0.367	0.134	0.563	0.633	1.190735695	0.178	0.695	75
Congo	-0.007 (-0.055)	0.162 (1.060)	0.165	0.027	0.838	0.835	0.981818181	-0.146	0.469	42
Ecuador	0.350 (6.383)	0.421 (6.521)	0.495	0.245	0.579	0.505	0.85050505	0.293	0.549	133
Egypt	0.079 (1.541)	0.275 (3.788)	0.294	0.086	0.725	0.706	0.935374149	0.132	0.419	154
Gabon	-0.447 (-4.552)	0.056 (0.446)	0.064	0.004	0.944	0.936	0.875	-0.195	0.306	51
Iran	0.054 (0.714)	0.340 (4.015)	0.289	0.083	0.660	0.711	1.176470588	0.173	0.507	179

N= Number of products with export more than 1000000 US dollars in either base (s1) or terminal (s2) time period.

$1-\beta$ = Regression effect

$1-R$ = Mobility effect

Table 6.3: Regression Estimates for Selected Oil exporting nations (continued)

Country	α	β	R	R^2	$1-\beta$	$1-R$	$\lvert\beta\rvert/\lvert R\rvert$	L_{95}	U_{95}	N
Libya	-0.380 (-3.561)	0.254 (1.842)	0.250	0.062	0.746	0.750	1.016	-0.023	0.531	53
Nigeria	-0.743 (-9.597)	0.010 (0.106)	0.012	0	0.990	0.988	0.833333333	-0.180	0.200	82
Norway	-0.054 (-1.867)	0.738 (13.979)	0.692	0.478	0.262	0.308	1.066473988	0.634	0.842	215
Oman	0.166 (3.139)	0.477 (6.853)	0.496	0.246	0.523	0.504	0.961693548	0.339	0.615	146
Qatar	-0.273 (-3.905)	0.338 (3.650)	0.372	0.138	0.662	0.628	0.90860215	0.154	0.522	85
Saudi Arabia	-0.244 (-5.956)	0.380 (6.298)	0.406	0.165	0.620	0.594	0.935960591	0.261	0.499	203
Syria	-0.122 (-1.899)	0.440 (5.121)	0.467	0.218	0.560	0.533	0.942184154	0.269	0.610	96
Venezuela	-0.180 (-4.417)	0.291 (4.462)	0.306	0.094	0.709	0.694	0.950980392	0.162	0.420	195
Yemen	-0.229 (-2.819)	0.060 (0.590)	0.080	0.006	0.940	0.920	0.750	-0.143	0.263	56

N= Number of products with export more than 1000000 US dollars in either base (s1) or terminal (s2) time period.

$1-\beta$ = Regression effect

$1-R$ = Mobility effect

In the other nations the value of β is statistically significant between zero and one which refers to the third criterion in section 3.5. In this case to interpret the results, regression $(1-\beta)$ and mobility effects $(1-R)$ should be studied. According to Taylor (2003) "a small regression effect suggests significant stability in the pattern of export specialisation" while "large values of R [or] R^2 suggest a low degree in mobility among export industries in that their rankings are relatively constant."

Based on Table 6.3, Norway with $(1-\beta)$ equal to 0.262 and Egypt with $(1-\beta)$ equal to 0.725 had the smallest and the biggest regression effect respectively. Other nations such as Algeria, Cameroon, Ecuador, Iran, Oman, Qatar, Saudi Arabia, Syria and Venezuela had high regression effects implying a meaningful degree of change in the level of export specialisation in these countries. Also, while the smallest mobility effect (0.308) occurred in Norway, Iran with $(1-R)$ equal to 0.711 had the biggest mobility effect during the time period. With respect to the results for other countries the mobility effects were considerably high. But in spite of these reasonable effects which we pointed out above, the ratio of $|\beta|/|R|$ was less than one in all nations except Cameroon, Iran and Norway which indicates no statistically significant diversification of the export portfolio for most of the oil exporting nations between 1988 and 2002.

As we pointed out at the beginning of the present chapter, the reference group[98] which we have chosen consisted of both WTO member-states and WTO non-member nations and

[98] Obviously, the results of the export portfolio analysis in this chapter depend on the nations which we have chosen as the reference group. Indeed, based on the aim of the present research utilising the export data for these 18 nations can help us to compare any change of the export basket in WTO members with non-member nations.

the above results can not show any meaningful differences between these two groups in terms of export portfolio changes between two time periods. In the next section, with respect to our findings in the present and previous chapter, we focus on oil exporting nations before and after 1995 to investigate the development path they pursued in the second time period.

6.4 Path Analysis and the Results

Obviously, the first things which should be considered before a discussion of the findings is carried out are the criteria for pursuing path A or B (see Figure 1.1 on page 17). As we stated at the start of this research, the main aim of doing the present study is to investigate whether or not oil exporting nations which joined the WTO have been stimulated by their membership and its consequential trade freedom to become more industrialised (or developed). In order to study the change in the industrialisation level in these countries, we focused on their export basket changes between two time periods from 1986 to 2003. A country has been on path B during the analysis period, when the relationship between its membership of the WTO and the share of crude petroleum in its export basket has been negative and also when the results of export portfolio analysis could show some range of diversification. Otherwise the nation has been on path A (see Figure 6.1 on page 149).

To specify the path for each nation, we refer to the findings/conclusions which we have reached in the present and previous chapters and then we interpret the results. In the first phase of this research the relationship between WTO membership and export dependency on crude oil have been studied in ten WTO member-states, namely Angola, Congo, Ecuador, Kuwait, Nigeria, Norway, Oman, Qatar, UAE, and Venezuela. In the second

phase, based on data availability, we studied export portfolios in Angola, Brunei, Cameroon, Congo, Ecuador, Egypt, Gabon, Nigeria, Norway, Oman, Qatar and Venezuela. Based on these two complementary sets of studies, we are able to conduct a path analysis for eight of the nations which are included in both of the above lists. In the rest of this section, with regard to the definition of the path which we have offered in the first chapter, we are going to discuss each nation separately to identify the path for each specific country.

The first nation which we focus on is Angola. Based on the regression analysis which we have done in chapter five, WTO membership as a dummy variable has stimulated both crude oil exports (XC) and total exports (TE) in this nation, but with respect to the regression coefficients which we have obtained for these two different dependent variables, it is possible to say that the effect of membership on TE has been greater than that on XC (see Table 5.11 on page 140). Utilising the coefficients in the regression formula indicates that in Angola WTO membership led to a decrease in the share of crude oil exports in the export portfolio during the period of study. This is the result of our investigation when we consider just the positive or negative sign of the coefficients in the formula. As Table 5.12 (see page 141-142) shows, the final results with statistically significant coefficients at a 95 percent level of confidence also confirm our findings about the change in TE as a consequence of WTO membership because the dummy variable only appeared in TE equation.

Despite our findings in the first phase of the research about Angola, the results of the export basket analysis in the second phase did not show any meaningful movement of the nation's exports towards diversification. In fact, there has been no relationship between

revealed symmetric comparative advantage (RSCA) before and after WTO membership in this country. In addition, a short review of top ten commodities in the export basket in the second period of time reveals that Angola with just 27 (after adjustment) different exportable products in the basket is still very far from being on path B (see Table 6.1). The very high difference between the percentages of product 333 (Crude petroleum) and the second commodity in Table 6.2 indicates that Angola's exports are still very dependent on crude petroleum since this is more than 88 percent in the basket.

Congo is the second country which we consider to evaluate the results of its export activities during the last two decades. In this nation, with respect to the sign of each coefficient in the regression formula, we have found that while the relationship between WTO membership and XC tends to be negative, it seems that membership of the WTO has positively stimulated TE. Despite these relationships, the coefficients have not been meaningful at a 95 percent level of confidence in XC and TE estimations.

As Table 5.12 shows, WTO dummy variable did not appear in XC and TE estimation equations. The export basket analysis in the second phase does not support any meaningful movement of the nation's exports towards diversification. Moreover, an investigation of the top ten commodities in the export basket in the second period of time reveals that there is still a very high difference between the percentages of crude oil as the number one exportable product and the second commodity in the Table 6.2, which indicates that Congo's exports are still very dependent on crude petroleum although its importance has declined in the export portfolio after WTO membership. Therefore, this nation, with only 35 different products in the export basket after WTO membership, still remains on path A.

The next nation which we study is Ecuador. Based on the negative and positive signs of the WTO estimator respectively in the XC and TE regression formulae, it can be seen that the dependency of the export portfolio on crude oil in Ecuador has declined after WTO membership. But, Table 5.12 shows that at a 95 percent level of confidence WTO dummy variable did not appear in XC and TE estimation equations. Moreover, export basket investigation in this country does not show considerable regression and mobility effects based on the Galtonian regression analysis. With $|\beta|/|R|$ less than one it seems that Ecuador has not diversified its export portfolio during the last two decades, although Table 6.1 indicates the adjusted number of exportable commodities has increased from 60 to 129 in this country during the specified time period. In other words, with respect to the criteria which we pointed out in the first chapter and based on export activities, the results show that Ecuador has started to move away from path A.

The effects of WTO membership on both XC and TE have been positive in Nigeria but surprisingly the effects on XC have been greater than TE. Indeed, it seems that the export dependency on crude petroleum increased after membership of the WTO. Also, adjusted regression equations at 95 percent of confidence level for XC and TE show no relationship between dependent variables and WTO dummy variable. Export portfolio analysis in the second phase of this research also confirmed that with more than 96 percent crude oil share in the export basket there has been no chance for the rest of the exportable commodities in this nation to help the process of export diversification. As Table 6.1 shows, the number of adjusted exportable products in Nigeria even decreased from 57 to 49 which supports the idea that Nigeria still is on path A.

The other nation which we study is Norway. Although the effects of WTO membership on both XC and TE have been positive in this country, the effects on TE have been more considerable than on XC. As Table 5.12 indicates WTO dummy variable appeared in TE estimation equation. Also, export portfolio analysis before and after WTO membership has shown that $|\beta|/|R|$ has been more than one which means that the export basket has changed towards diversification even more than in the past. Norway with 206 exportable commodities has the most diversified export portfolio amongst oil exporting nations. Moreover, the top ten exportable products table says the nation is already on path B.

In Oman, the effects of WTO membership on XC and TE have been supportive for both dependent variables, which means that after membership crude oil and also total exports have increased, although TE has been more stimulated by the previously described impacts than XC. Also, Table 5.12 shows that WTO dummy variable appeared in TE estimation equation. As a result of this latter fact, export dependency on crude oil has declined after membership of the WTO. With respect to the analysis which has been done in the second phase of the present research, the export portfolio in this country does not seem to be diversified with $|\beta|/|R|$ less than one and with few regression and mobility impacts during the time period. On the other hand, the investigation of the top ten exportable commodities in this nation revealed that not only the share of crude petroleum in the export basket decreased from more than 88 to nearly 72 percent, but also the adjusted number of exportable commodities increased from 89 to 143. This type of important change in the export portfolio from 1988 to 2002 indicates that the nation has tried to move away from path A after joining the WTO.

The next nation which we study is Qatar. The impacts of WTO membership on XC and TE in this country have been quite different from the other nations which we have studied in this research. In fact, based on the results it seems that WTO membership has prevented Qatar from expanding not only its crude oil but also its total exports. In addition, this, the negative membership impacts on TE have been more considerable than on XC. Also, based on Table 5.12 adjusted regression equations at 95 percent of confidence level for XC and TE show no relationship between dependent variables and WTO dummy variable. Although with β between zero and one and regarding the effects of high regression and mobility, we can see a change in the export basket between the two time periods, however $|\beta|/|R|$ is less than one so we cannot say that export diversification happened after WTO membership in this country. The top ten commodities rank analysis in Qatar also leads us to note a change in the importance of crude oil in the export basket as a result of a huge increase in gas exports. Indeed, although the export dependency of the nation on crude petroleum has been halved after WTO membership, the country is still supposed to be on path A because of the low number of exportable commodities in the portfolio.

The last nation which we focus on in this section is Venezuela. Export portfolio analysis in this country confirms that there have been considerable regression and mobility effects but with $|\beta|/|R|$ less than one the export portfolio does not seem to be diversified based on the criteria which we pointed out in chapter three. In addition, the export dependency on crude oil has increased after membership of the WTO because, as the regression analysis in chapter five shows, the WTO impact on XC and TE has been positive, while at the same time the effect on XC has been greater than TE. Table 5.12 also confirms that

at 95 percent level of confidence only XC affected by WTO dummy variable. With regard to Table 6.2, we can see an increase in the dependency of the nation on its exports of crude petroleum, also the adjusted number of exportable commodities has changed from 167 to 178 which does not indicate any considerable change in the export basket. Moreover, the table confirms that the first three commodities places in the ranking – consisting of more than 85 percent of total exports – have not changed between the two periods of time. Therefore, based on the conclusions which we have noted about Venezuela, we can say that the nation still is on path A.

In the above section, we analysed the relevant path for the eight oil exporters based on information which we prepared in both phase one and two. But, for some nations we did not have the appropriate related data for doing a two-phase analysis. Therefore, we explain the results of the analysis for these nations with regard to one phase information without recognising any specific path. For Kuwait and UAE the results of the relationship between WTO membership and XC or TE also confirm a positive relationship between the dependent and independent variables. In addition, based on the regression analysis which was done in chapter five, the impact of membership on TE has been more considerable than on XC, although at a 95 percent level of confidence WTO dummy variable did not appear in XC and TE equations in these nations.

Cameroon and Brunei are two other nations whose export portfolio we have analysed in chapter six. The first important point to note about these countries concerns their export dependency on crude oil which seems to have remained unchanged. Although there is no direction in the change of the export basket in Brunei before and after WTO membership, the export portfolio has changed in Cameroon in a different way. In fact, while the

number of other exportable commodities (NOEC), based on Table 6.2, decreased in Cameroon, it increased very slightly in Brunei. In the case of Egypt we see high regression and mobility effects in export portfolio analysis, and based on Appendix 9 we know that the dependency of the nation's exports on crude oil decreased after WTO membership. Table 6.1 also showed that the number of exportable products increased in this nation from 126 to 140 commodities. In the case of Gabon, based on the export portfolio analysis, it can be seen that RSCA has changed from the first period (1988-1990) to the second (2000-2002) randomly which confirms that there is no considerable diversification in the export portfolio of the nation. Also, the investigation of top ten commodities (see Table 6.2) shows that the country's exports still are highly dependent on crude oil. To see a clear picture of our two-phase analysis, we summarise the results of both phases in Table 6.4.

Table 6.4: Two-phase analysis summary table

Nation	***Phase one***			***Phase two***		***Recognised path***	
	WTO-CER			***Export Diversification***			
	Negative	***No relationship***	***Positive***	***No***	***Yes***	***A***	***B***
Angola	***Negative***			***No***		***A***	
Congo	***No relationship***			***No***		***A***	
Ecuador	***No relationship***			***No***		***A***	
Nigeria	***No relationship***			***No***		***A***	
Norway	***Negative***			***Yes***		***B***	
Oman	***Negative***			***No***		***A***	
Qatar	***No relationship***			***No***		***A***	
Venezuela	***Positive***			***No***		***A***	

To complete our export portfolio analysis in this chapter, we also analysed RSCA changes in all 20 oil exporting nations from 1995 to 2005 (see the list of these nations in Appendix 2). This final complementary analysis has been done based on a complete set of data which can be found in the UNCTAD statistics 2006. The database includes the most updated data which is classified with regard to different SITC codes for all these countries. This classification has not only allowed us to analyse changes in the comparative advantage in different commodity groups from 1995 to 2005, but has also helped us to design a special graph for each country in the specified time period. At the left side of this graph we study the changes in RSCA in primary goods while on the right side we investigate RSCA in different classes of manufactured commodities. Also, the time period allows us to see the trade pattern of oil exporting nations in the 10 years after the WTO came into existence. To calculate RSCA in this investigation, we compared each nation with the rest of the world; therefore the result fully indicates the relative place of each oil exporter in the world economy.

With reference to Appendix 13 (for WTO non-member nations) and Appendix 14 (for WTO member-states) the first important point to note is that all of these nations had a comparative advantage in exporting primary goods (especially fuels) during the period of study. Secondly, the shape of the graph for each country in 2005 is more or less akin to its shape in 1995 which means that there is no tangible change in the comparative advantage of both WTO member-nations and non-member countries after 1995. While all of these countries had a comparative advantage to produce and export commodities in classes 1 and 5, there was no oil exporter who had a positive RSCA to export commodities in categories number 9, 10, 11, and 12 at the right side of the graph.

These results appear to confirm our previous findings in this chapter, and support the conclusion that WTO membership and its consequent trade liberalisation does not automatically change the comparative advantage in its member-states.

6.5 Chapter Summary

In this chapter we studied the changes in export portfolio in oil exporting countries in two three-year periods of time before and after 1995. With regard to categorising these nations into two different groups as WTO member-states and non-member nations, and based on the investigations which we have carried out in this chapter, it is possible to say that there is no meaningful difference between the countries' export behaviour from the first period of study (1988-1990) to the second (2000-2002). On the one hand, we have a number of WTO non-member countries such as Algeria or Iran which have expanded their exports with high regression and mobility effects in combination with reducing their dependency on crude petroleum exports. On the other hand, the results indicate that no considerable efforts towards export diversification have been made in countries like Nigeria or Gabon which have been WTO members since 1995. In addition, the rate of export dependency on crude oil has increased in these nations between the two time periods. These findings suggest that WTO does not automatically stimulate its members to change their comparative advantage. Indeed, the top ten ranking of exportable commodities supports this conclusion.

Chapter 7

Research Results and Recommendations

Introduction

In this chapter we utilise the results of the export portfolio analysis which have been carried out in both phase one (a two-commodity basis export basket analysis) and phase two (a deep export portfolio change analysis) to draw conclusions about whether WTO membership has changed the export basket in oil exporting nations. This chapter consists of four sections. The first part focuses on the aim of the research and its contribution to the expansion of the related knowledge area. The second section indicates the research limitations and the related effects which they may have on the results. Section three provides recommendations which may help both researchers and policy makers to investigate the effects of international trade liberalisation on the industrialisation process in the future. Finally, we briefly explain the conclusions and results which we have reached in this research in section four.

7.1 Research Results and Conclusions

As we have seen in chapter 2, trade freedom and its impact on economic growth has been studied for more than a century. During this long period of time different researchers have focused on the free trade phenomenon and have also tried to find a widely acceptable proxy for it. In spite of this long-standing scholarship, there is no sign of agreement on this issue yet. In fact, different researchers have used different openness proxies in their research to measure the degree of trade liberalisation. To support this idea, we can see different trade openness indices such as the Anderson-Neary openness indicator, the Leamer openness index, the Sachs and Warner openness index or the Heritage foundation index which were calculated based on utilising different definitions for trade openness.

In addition, the development and industrialisation variables which have been under investigation on the other side of the *trade freedom-development* or *trade freedom-industrialisation* relationships have varied from research to research. In other words, we can see a variety of development or industrialisation criteria being utilised in different studies. In fact, as well as the inherent complexity of the relationship between trade freedom and development, difficulties in measuring the degree of trade liberalisation and the development level indices have persuaded researchers to utilise different analytical frameworks to carry out their investigations. As we pointed out in the literature review (chapter 2), research in this complex knowledge area has not reached a widely acceptable consensus yet. Therefore, there is still a considerable amount of scholarly interest in probing the relationship between trade liberalisation and industrialisation or development. Furthermore, new research can offer useful insights to policy-makers in terms of better

understanding the mechanisms through which developing nations can start their economic growth process.

In 1995 the WTO started its activities based on trade freedom slogans. The organisation not only supported trade openness amongst its members, but also tried to govern international trade amongst its member-nations with its rules and regulations. This means that the WTO prescribed trade freedom as a way to achieve industrialisation and economic growth for most of its member-states which were under developed. After 1995 researchers have studied the organisation from a different point of view. Some of these investigations have been discussed in chapter 2. The present research has focused on the impact of WTO prescription – trade freedom – on the export portfolio of oil exporting nations as a group of developing countries. We have analysed the export portfolio of these countries to investigate to what extent WTO membership may change the industrialisation level in these nations.

This is the first time that the export portfolio has been used to probe the effects of WTO membership on the industrialisation level of a group of developing nations. Indeed, we focused on these countries' output to find a more measurable and understandable result in comparison with previous researches which have been done in this knowledge area. Also, in this research our sample nations have been studied at both the aggregate and disaggregate level. Most of these countries have been focused on – for the first time – to investigate the effect of WTO membership on their industrialisation level. In spite of most of the prospective analysis methods which have been utilised to study the impact of WTO-led trade liberalisation on member-states' economies, the present research used a retrospective method as its analytical framework to conduct this study based on observed

data. This analytical method allows us to analyse the effects of a policy such as trade liberalisation on different economies based on information available after the policy has been implemented and its performance observed, which is more reliable for nations who would like to utilise international trade as a stimulus for their industrialisation process. Moreover, in this research, instead of focusing on some limited industries which have been investigated in some developing economies, we emphasised the export portfolio in order to study the impact of WTO membership on exported output in each sample nation. With respect to the points which we have mentioned briefly above and with reference to the research questions, we conclude as follows:

1- The results of this investigation are not consistent with the hypothesis that the export dependency of oil exporting nations on crude oil declines following membership of the WTO. On the one hand, in most of these nations the degree of trade freedom has increased after WTO membership. On the other hand, it is clear that the result of trade liberalisation has not been the same in these different oil exporting countries.

2- The results of the empirical study in this research are not consistent with the hypothesis that the export portfolio of oil exporting nations diversified after becoming members of the WTO. As the research findings indicate, this did not happen in most of the oil exporting nations after they joined the WTO.

The above-mentioned results which support previous studies like Kravis (1970), Salvatore (1983, 1992), Reidel (1984), Ram (1987), Salvatore and Hatcher (1991), Dollar (1992), and Greenaway and Sapsford (1995), indicate that international trade can greatly

facilitate and support growth more as a "handmaiden" than as an engine of growth,[99] and show that WTO membership and its consequent trade liberalisation does not automatically enable oil exporting nations to change their comparative advantage from primary to manufactured commodities. In other words, utilising trade as a way to move towards industrialisation did not occur automatically in these nations through WTO membership.

Referring to Appendix 12, if we compare the main exportable commodities before and after WTO membership in oil exporting nations, it will be seen that besides crude oil – which has been commodity number one in the export basket of all these nations except Algeria and Egypt – other exported products in the second period have been mostly primary commodities such as gas, residual petroleum products, base metals and ores, aluminum, fish (fresh, chilled, frozen), shell fish (fresh, frozen), coffee and substitutes, cocoa, fruit (nuts, fresh, dried), textile, cotton and wood. In other words, these nations have still exported primary products after WTO membership based on their dominant comparative advantage which they had before membership of the WTO. With respect to these findings the following negative aspects of being in path A[100] can be highlighted:

1- While nations continue to emphasise the production and export of primary commodities, freer trade may support the export earnings in oil exporting nations in the short-run but can not lead them towards specific industrialisation targets.

2- Normally, an export basket dominated by primary products prevents them from using dynamic benefits from international trade.

[99] Quoted in Salvatore (1996).

[100] For more information see Figure 1.1, page 17 and Figure 6.1, page 149.

3- While the export dependency on crude oil (after WTO membership) is still very high for most oil exporters, the current reserves/production ratio (R/P) in these nations indicates a serious reduction in export earnings in the future.[101] This may occur especially in some countries which could not start earning money from non-primary exportable commodities after they became members of the WTO.

7.2 Research Limitations and Result Interpretation

There are important limitations which should be considered in any interpretation of the present research findings. We classify these limitations into two different groups. The first category of these limitations refers to the data which we utilised in this research. Like every other empirical study the accuracy of the present research findings directly depends on the accuracy of the available data. It should be kept in mind that in this study we have used thousands of data points about oil exporting nations. Such a huge amount of data of this kind is likely to contain some wrong information. However, to prevent any misleading results we used the most accurate data which has been gathered from the currently best available sources like UNCTAD or BP.

Besides the above-mentioned point, gathering information about some oil exporting nations was not possible due to either unavailability of data (e.g. Azerbaijan) or insufficiency of data (e.g. Iraq). In fact, with reference to the time interval which we used in this research, gathering information for Azerbaijan was not possible because this nation was a part of the former USSR before 1991, and also information for Iraq was not available because of the war. To reach a strong result, we gathered data for some oil exporting nations with economies similar to Iraq or Azerbaijan.

[101] Based on Table 1.1, R/P ratio shows the estimated time (in year basis) which these nations can produce crude oil after 2003.

The second category of limitations refers to the time period which we have chosen to study the impacts of WTO membership on oil exporting nations. In this research, we investigated the changes in the export portfolio in these countries between 1986 and 2003. Although in our research the evidence to date does not provide a rigorous relationship between WTO membership and the export portfolio changes in oil exporters, it should be kept in mind that it may take more time before the impact of membership will be seen. Doing the present study on a longer period of time after the membership date of the sample nations in the WTO may enrich the results by allowing for longer effects of trade liberalisation and institutional membership. Not withstanding these limitations, this study provides a more robust examination of the impact of WTO membership on the industrialisation process compared with the existing empirical literature, and also this research could be considered as a fruitful avenue for future studies under the same theme.

7.3 Recommendations

The process of WTO membership has usually been expensive for most developing nations because firstly, they have to adapt their economies to freer trading systems, and also they have to obey a complex set of trade related rules and regulations. Nations may accept this cost because they expect to obtain benefits in terms of industrialisation and economic development. As we said earlier, a number of studies tell us that WTO-led trade liberalisation can stimulate the industrialisation and development process, but we believe that a general prescription like this can not be utilised in all nations in the same way because basically they are not the same. To draw more practical and helpful results from future studies in the related area of the knowledge, we suggest two possible

directions for these researches: Future studies can be more helpful if they consider the effects of trade liberalisation alongside other basic development factors (on the industrialisation and development) to account for the complexity of economic growth processes. Also, these studies will be more reliable if are accompanied by case study analysis to capture some of the complexity underlying quantitative data.

For both of the above-mentioned suggestions, we refer to the complexity of the relationship between trade and development or industrialisation. As we have seen in chapter 2, there is no simple model which can satisfactorily explain this complex relationship yet. In fact, economic thinkers utilise simple models to explain economic phenomena, but normally the reality is more complex than the related models. In the literature review we suggested that not only trade freedom but also economic development factors or indices are not able to explain the real phenomena well. It is clear that the kind of models which have been constructed based on weakly defined factors can not predict the exact relationship between trade and economic growth, especially when we use the data from a number of different nations. In other words, judgment about the future of developing nations based on simple models may be highly misleading. To prevent mis-prediction, we believe that researchers would benefit from studying each country separately to complement quantitative analysis at the macro level. This will help them to identify the factors which may affect the relationship between trade and development or industrialisation in each specific nation. These are factors which may not be easily captured in existing indicators and not only may be different from nation to nation, but also may vary from time to time in each country. In fact, we believe that the generalisation of the findings of the previous studies may not help developing nations to

find a way from trade to economic growth without a deep analysis of each specific economy. No one claims that the only factor which can affect economic development in a nation is trade. In other words, there are other factors in each economy whose effects may stimulate or prevent the development process. We recommend that the priority is to recognise these factors in each specific nation in future studies because the results of such investigations can clarify the mechanism which indicates how development may occur as a result of freer trade. For example, Salvatore (1996) described a mechanism which explains the trade-development relationship. Based on the theory which has been pointed out by Salvatore, the lowering of trade barriers – or, in other words, trade liberalisation – will support economic growth in developing nations through absorbing new technologies, stimulating research and development activities, economies of scale, more efficient production, more efficient resource utilisation and also introducing new products and commodities. Therefore, we recommend that to improve the knowledge area and also to achieve results that have more applicability, the effects of some factors like skilful human resources, innovation-driven investors, competitive industries, quality of management, quality of regulatory environment and supportive infrastructure should be studied as part of trade-development or trade-industrialisation relationship investigations in each specific country. Launching new indicators and case study research may help to lead to more qualified judgments on the development process.

With reference to policy-modelling, as we said earlier, oil exporting countries have to try to develop in a shorter time period because only in this way they may prevent a big shock which may result from removing crude oil from their export basket on their economic structures. This could be even more vital for some poor and populous developing nations.

We believe that, at the macroeconomic level, oil exporting nations should adjust their development policies taking account of the limited time dimension related to their crude oil Reserves/Production (R/P) ratio. These countries should also think about the new sources of energy which they need in future after the end of their crude oil reserves. Utilising efficient financial and monetary policies to prevent Dutch disease during the period of transition towards a new modern economy is the other factor which should be considered by oil exporters. Human capital improvement should be prioritised in these economies in order to be prepared for technology absorption and structural changes. Moreover, they should focus on improving infrastructure to support their integration in the world market.

At the microeconomic level, there is a priority to allocate national wealth in industries which are more compatible with the existing comparative advantage and also can produce a convenient platform for new modern competitive industries in future. At the same time these nations should focus on finding different new tradable manufactured products to export. In other words, they should exchange temporary money from oil exports to permanent wealth by investment on industries with potential profit which can produce more complex commodities. Infant industries which potentially can be competitive in the world market in future should be supported in a limited period of time. And last but not least, they should put emphasis on producing and exporting different profitable services. At the end, we should say that changing the comparative advantage from primary commodities production and export towards more complex products intentionally requires a huge effort, and trade liberalisation can be only part of these challenging activities.

7.4 Chapter Summary

In this chapter we combined what we have found from the analysis of export basket dependency on crude oil with a deep analysis of export portfolio to find out whether or not WTO membership has changed industrialisation level in oil exporting nations. As the results show, WTO membership and its consequent trade liberalisation does not automatically enable oil exporting nations to change their comparative advantage from primary to manufactured commodities. While in some nations there was no relationship between WTO membership and their export dependency on crude oil, in the others a negative or positive effect has been revealed, which means that no consistent impact has been found in this matter. In addition, export portfolio analysis which considered all the different products in the export basket showed that there was no meaningful diversification in the export portfolio in most of these nations after their membership of the WTO. Based on our findings, we recommend that future studies should focus on important factors such as skilful human resources, innovation-driven investors, competitive industries, quality of management, quality of regulatory environment and supportive infrastructure when they investigate the relationship between trade and development or industrialisation. In brief, we should treat economic growth as a more complex target than a single phenomenon which can just be explained with liberalising trade in developing nations. Movement towards development can be stimulated by utilising efficient combinations of different factors and trade liberalisation could be one of them. Future studies may reveal these combinations and the related effects on the economic structure of developing nations.

Appendices

WTO member list October 2004, with dates of membership

Albania 8 September 2000
Angola 23 November 1996
Antigua and Barbuda 1 January 1995
Argentina 1 January 1995
Armenia 5 February 2003
Australia 1 January 1995
Austria 1 January 1995
Bahrain, Kingdom of 1 January 1995
Bangladesh 1 January 1995
Barbados 1 January 1995
Belgium 1 January 1995
Belize 1 January 1995
Benin 22 February 1996
Bolivia 12 September 1995
Botswana 31 May 1995
Brazil 1 January 1995
Brunei Darussalam 1 January 1995
Bulgaria 1 December 1996
Burkina Faso 3 June 1995
Burundi 23 July 1995
Cambodia 13 October 2004
Cameroon 13 December 1995
Canada 1 January 1995
Central African Republic 31 May 1995
Chad 19 October 1996
Chile 1 January 1995
China 11 December 2001
Colombia 30 April 1995
Congo 27 March 1997
Costa Rica 1 January 1995
Côte d'Ivoire 1 January 1995
Croatia 30 November 2000
Cuba 20 April 1995
Cyprus 30 July 1995
Czech Republic 1 January 1995
Democratic Republic of the Congo 1 January 1997
Denmark 1 January 1995
Djibouti 31 May 1995
Dominica 1 January 1995
Dominican Republic 9 March 1995
Ecuador 21 January 1996
Egypt 30 June 1995
El Salvador 7 May 1995
Estonia 13 November 1999
European Communities 1 January 1995
Fiji 14 January 1996
Finland 1 January 1995
Former Yugoslav Republic of Macedonia (FYROM) 4 April 2003
France 1 January 1995
Gabon 1 January 1995
The Gambia 23 October 1996
Georgia 14 June 2000
Germany 1 January 1995
Ghana 1 January 1995
Greece 1 January 1995
Grenada 22 February 1996
Guatemala 21 July 1995
Guinea 25 October 1995
Guinea Bissau 31 May 1995
Guyana 1 January 1995
Haiti 30 January 1996
Honduras 1 January 1995
Hong Kong, China 1 January 1995
Hungary 1 January 1995
Iceland 1 January 1995
India 1 January 1995
Indonesia 1 January 1995
Ireland 1 January 1995
Israel 21 April 1995
Italy 1 January 1995
Jamaica 9 March 1995
Japan 1 January 1995
Jordan 11 April 2000
Kenya 1 January 1995
Korea, Republic of 1 January 1995
Kuwait 1 January 1995
Kyrgyz Republic 20 December 1998
Latvia 10 February 1999
Lesotho 31 May 1995
Liechtenstein 1 September 1995
Lithuania 31 May 2001
Luxembourg 1 January 1995
Macao, China 1 January 1995
Madagascar 17 November 1995
Malawi 31 May 1995
Malaysia 1 January 1995
Maldives 31 May 1995
Mali 31 May 1995
Malta 1 January 1995
Mauritania 31 May 1995
Mauritius 1 January 1995
Mexico 1 January 1995
Moldova 26 July 2001
Mongolia 29 January 1997
Morocco 1 January 1995
Mozambique 26 August 1995
Myanmar 1 January 1995
Namibia 1 January 1995
Nepal 23 April 2004

Netherlands — For the Kingdom in Europe and for the Netherlands Antilles 1 January 1995
New Zealand 1 January 1995
Nicaragua 3 September 1995
Niger 13 December 1996
Nigeria 1 January 1995
Norway 1 January 1995
Oman 9 November 2000
Pakistan 1 January 1995
Panama 6 September 1997
Papua New Guinea 9 June 1996
Paraguay 1 January 1995
Peru 1 January 1995
Philippines 1 January 1995
Poland 1 July 1995
Portugal 1 January 1995
Qatar 13 January 1996
Romania 1 January 1995
Rwanda 22 May 1996
Saint Kitts and Nevis 21 February 1996
Saint Lucia 1 January 1995
Saint Vincent & the Grenadines 1 January 1995
Senegal 1 January 1995
Sierra Leone 23 July 1995
Singapore 1 January 1995
Slovak Republic 1 January 1995
Slovenia 30 July 1995
Solomon Islands 26 July 1996
South Africa 1 January 1995
Spain 1 January 1995
Sri Lanka 1 January 1995
Suriname 1 January 1995
Swaziland 1 January 1995
Sweden 1 January 1995
Switzerland 1 July 1995
Chinese Taipei 1 January 2002
Tanzania 1 January 1995
Thailand 1 January 1995
Togo 31 May 1995
Trinidad and Tobago 1 March 1995
Tunisia 29 March 1995
Turkey 26 March 1995
Uganda 1 January 1995
United Arab Emirates 10 April 1996
United Kingdom 1 January 1995
United States of America 1 January 1995
Uruguay 1 January 1995
Venezuela 1 January 1995
Zambia 1 January 1995
Zimbabwe 5 March 1995

Observer governments

Algeria
Andorra
Azerbaijan
Bahamas
Belarus
Bhutan
Bosnia and Herzegovina
Cape Verde
Equatorial Guinea
Ethiopia
Holy See (Vatican)
Iraq
Kazakhstan
Lao People's Democratic Republic
Lebanese Republic
Libya
Russian Federation
Samoa
Sao Tome and Principe
Saudi Arabia
Serbia and Montenegro
Seychelles
Sudan
Tajikistan
Tonga
Ukraine
Uzbekistan
Vanuatu
Viet Nam
Yemen

Note: With the exception of the Holy See, observers must start accession negotiations within five years of becoming observers.

Source: WTO members list 2004 [online]. Available from: http://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm [Accessed 15/11/04].

Oil exporting nations in the present research

Country	WTO membership date	CER1 (%)	Oil proved reserves Share of total 2003 (%)
	1	2	3
Angola	11/96	90.86	0.8
Brunei	01/95	48.32	0.1
Cameroon	12/95	40.54	0.0
Republic of Congo	03/97	87.46	0.1
Ecuador	01/96	38.17	0.4
Egypt	06/95	31.49	0.3
Gabon	01/95	80.38	0.2
Kuwait	01/95	53.35	8.4
Nigeria	01/95	93.82	3.0
Norway	01/95	33.41	0.9
Oman	11/00	74.95	0.5
Qatar	01/96	67.11	1.3
United Arab Emirates	04/96	47.25	8.5
Venezuela	01/95	55.41	6.8
Algeria	–	44.47	1.0
Iran	–	84.50	11.4
Libya	–	76.79	3.1
Saudi Arabia	–	73.12	22.9
Syria	–	43.01	0.2
Yemen	–	79.73	0.1

Sources: (Column 1) WTO members list 2004 [online]. Available from: http://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm [Accessed 15/11/04].
(Column 2) Author calculations based on UNCTAD, OPEC, and OAPEC datasets.
(Column 3) BP Statistical Review of World Energy June 2004 [online]. Available from: http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/publications/energy_reviews/STAGING/local_assets/downloads/spreadsheets/statistical_review_of_world_energy_full_report_workbook_2004.xls
[Accessed 03/12/04].

WDI Online List of Time Series Indicators
630 series development indicators based on the following criteria
People • Environment • Economy • States & Markets • Global Links

People

Population and demographics

Age dependency ratio (dependents to working-age population)
Birth rate, crude (per 1,000 people)
Contraceptive prevalence (% of women ages 15-49)
Death rate, crude (per 1,000 people)
Fertility rate, total (births per woman)
Life expectancy at birth, female (years)
Life expectancy at birth, male (years)
Life expectancy at birth, total (years)
Mortality rate, adult, female (per 1,000 female adults)
Mortality rate, adult, male (per 1,000 male adults)
Mortality rate, infant (per 1,000 live births)
Mortality rate, under-5 (per 1,000)
Population ages 0-14 (% of total)
Population ages 65 and above (% of total)
Population density (people per sq km)
Population growth (annual %)
Population, female (% of total)
Population, total

Labor and employment

Employees, agriculture, female (% of female employment)
Employees, agriculture, female (% of total agricultural employment)
Employees, agriculture, male (% of male employment)
Employees, industry, female (% of female employment)
Employees, industry, male (% of male employment)
Employees, services, female (% of female employment)
Employees, services, male (% of male employment)
Employment in agriculture (% of total employment)
Employment in industry (% of total employment)
Employment in services (% of total employment)
Labor force with primary education (% of total)
Labor force with primary education, female (% of female labor force)
Labor force with primary education, male (% of male labor force)
Labor force with secondary education (% of total)
Labor force with secondary education, female (% of female labor force)
Labor force with secondary education, male (% of male labor force)
Labor force with tertiary education (% of total)

Labor force with tertiary education, female (% of female labor force)
Labor force with tertiary education, male (% of male labor force)
Labor force, children 10-14 (% of age group)
Labor force, female (% of total labor force)
Labor force, total
Long-term unemployment (% of total unemployment)
Long-term unemployment, female (% of female unemployment)
Long-term unemployment, male (% of male unemployment)
Population ages 15-64 (% of total)
Unemployment with primary education (% of total unemployment)
Unemployment with secondary education (% of total unemployment)
Unemployment with tertiary education (% of total unemployment)
Unemployment, female (% of female labor force)
Unemployment, male (% of male labor force)
Unemployment, total (% of total labor force)
Unemployment, youth female (% of female labor force ages 15-24)
Unemployment, youth male (% of male labor force ages 15-24)
Unemployment, youth total (% of total labor force ages 15-24)

Poverty and income distribution

GINI index
Income share held by fourth 20%
Income share held by highest 10%
Income share held by highest 20%
Income share held by lowest 10%
Income share held by lowest 20%
Income share held by second 20%
Income share held by third 20%
Poverty gap at $1 a day (PPP) (%)
Poverty gap at $2 a day (PPP) (%)
Poverty headcount ratio at $1 a day (PPP) (% of population)
Poverty headcount ratio at $2 a day (PPP) (% of population)
Poverty headcount ratio at national poverty line (% of population)
Poverty headcount ratio at rural poverty line (% of rural population)
Poverty headcount ratio at urban poverty line (% of urban population)

Education

Expenditure per student, primary (% of GDP per capita)
Expenditure per student, secondary (% of GDP per capita)
Expenditure per student, tertiary (% of GDP per capita)
Gross intake rate in grade 1, female (% of relevant age group)
Gross intake rate in grade 1, male (% of relevant age group)
Gross intake rate in grade 1, total (% of relevant age group)
Literacy rate, adult female (% of females ages 15 and above)
Literacy rate, adult male (% of males ages 15 and above)
Literacy rate, adult total (% of people ages 15 and above)

Literacy rate, youth female (% of females ages 15-24)
Literacy rate, youth male (% of males ages 15-24)
Literacy rate, youth total (% of people ages 15-24)
Net intake rate in grade 1 (% of official school-age population)
Net intake rate in grade 1, female (% of official school-age population)
Net intake rate in grade 1, male (% of official school-age population)
Persistence to grade 5, female (% of cohort)
Persistence to grade 5, male (% of cohort)
Persistence to grade 5, total (% of cohort)
Primary completion rate, female (% of relevant age group)
Primary completion rate, male (% of relevant age group)
Primary completion rate, total (% of relevant age group)
Primary education, pupils
Primary education, pupils (% female)
Primary education, teachers (% female)
Public spending on education, total (% of GDP)
Pupil-teacher ratio, primary
Ratio of girls to boys in primary and secondary education (%)
Ratio of young literate females to males (% ages 15-24)
Repetition rate, primary (% of total enrollment)
Repetition rate, primary, female (% of total enrollment)
Repetition rate, primary, male (% of total enrollment)
School enrollment, preprimary (% gross)
School enrollment, primary (% gross)
School enrollment, primary (% net)
School enrollment, primary, female (% gross)
School enrollment, primary, female (% net)
School enrollment, primary, male (% gross)
School enrollment, primary, male (% net)
School enrollment, secondary (% gross)
School enrollment, secondary (% net)
School enrollment, secondary, female (% gross)
School enrollment, secondary, female (% net)
School enrollment, secondary, male (% gross)
School enrollment, secondary, male (% net)
School enrollment, tertiary (% gross)
School enrollment, tertiary, female (% gross)
School enrollment, tertiary, male (% gross)
Secondary education, pupils
Secondary education, pupils (% female)
Trained teachers in primary education (% of total teachers)

Health

ARI prevalence (% of children under 5)
ARI treatment (% of children under 5 taken to a health provider)

Births attended by skilled health staff (% of total)
Diarrhea prevalence (% of children under 5)
Diarrhea treatment (% of children under 5 who received ORS packet)
External resources for health (% of total expenditure on health)
Female adults with HIV (% of population ages 15-49 with HIV)
Health expenditure per capita (current US$)
Health expenditure, private (% of GDP)
Health expenditure, public (% of GDP)
Health expenditure, total (% of GDP)
Hospital beds (per 1,000 people)
Immunization, DPT (% of children ages 12-23 months)
Immunization, measles (% of children ages 12-23 months)
Improved sanitation facilities (% of population with access)
Improved water source (% of population with access)
Inpatient admission rate (% of population)
Malnutrition prevalence, height for age (% of children under 5)
Malnutrition prevalence, weight for age (% of children under 5)
Out-of-pocket health expenditure (% of private expenditure on health)
Physicians (per 1,000 people)
Prevalence of HIV, total (% of population aged 15-49)
Prevalence of undernourishment (% of population)

Environment

Land use and agricultural production

Agricultural machinery, tractors
Agricultural machinery, tractors per agricultural worker
Agricultural machinery, tractors per hectare of arable land
Agriculture value added per worker (constant 2000 US$)
Cereal production (metric tons)
Cereal yield (kg per hectare)
Crop production index (1999-2001 = 100)
Fertilizer consumption (100 grams per hectare of arable land)
Fertilizer consumption (metric tons)
Food production index (1999-2001 = 100)
Forest area (% of land area)
Land area (hectares)
Land area (sq km)
Land use, arable land (% of land area)
Land use, arable land (hectares per person)
Land use, arable land (hectares)
Land use, area under cereal production (hectares)
Land use, irrigated land (% of cropland)
Land use, irrigated land (hectares)

Land use, other (% of land area)
Land use, permanent cropland (% of land area)
Livestock production index (1999-2001 = 100)
Permanent pasture (% of land area)
Population density, rural (people per sq km)
Rural population
Rural population (% of total population)
Rural population growth (annual %)
Surface area (sq km)

Energy production and use

Combustible renewables and waste (% of total energy)
Electricity production (kwh)
Electricity production from coal sources (% of total)
Electricity production from hydroelectric sources (% of total)
Electricity production from natural gas sources (% of total)
Electricity production from nuclear sources (% of total)
Electricity production from oil sources (% of total)
Energy imports, net (% of commercial energy use)
Energy production (kt of oil equivalent)
Energy use (kg of oil equivalent per capita)
Energy use (kt of oil equivalent)
Energy use per PPP GDP (kg of oil equivalent per constant 2000 PPP $)
GDP per unit of energy use (2000 US$ per kg of oil equivalent)
GDP per unit of energy use (constant 2000 PPP $ per kg of oil equivalent)
GDP per unit of energy use (PPP $ per kg of oil equivalent)

Urbanization

Improved sanitation facilities, rural (% of rural population with access)
Improved sanitation facilities, urban (% of urban population with access)
Improved water source, rural (% of rural population with access)
Improved water source, urban (% of urban population with access)
Passenger cars (per 1,000 people)
Pump price for diesel fuel (US$ per liter)
Pump price for super gasoline (US$ per liter)
Two-wheelers (per 1,000 people)
Urban population
Urban population (% of total)
Urban population growth (annual %)
Vehicles (per 1,000 people)
Vehicles (per km of road)

Emissions

CO2 emissions (kg per 2000 PPP $ of GDP)
CO2 emissions (kg per 2000 US$ of GDP)
CO2 emissions (kt)
CO2 emissions (metric tons per capita)

Organic water pollutant (BOD) emissions (kg per day per worker)
Organic water pollutant (BOD) emissions (kg per day)
Water pollution, chemical industry (% of total BOD emissions)
Water pollution, clay and glass industry (% of total BOD emissions)
Water pollution, food industry (% of total BOD emissions)
Water pollution, metal industry (% of total BOD emissions)
Water pollution, other industry (% of total BOD emissions)
Water pollution, paper and pulp industry (% of total BOD emissions)
Water pollution, textile industry (% of total BOD emissions)
Water pollution, wood industry (% of total BOD emissions)

Adjusted savings

Adjusted net savings, excluding particulate emission damage (% of GNI)
Adjusted net savings, including particulate emission damage (% of GNI)
Adjusted savings: carbon dioxide damage (% of GNI)
Adjusted savings: consumption of fixed capital (% of GNI)
Adjusted savings: education expenditure (% of GNI)
Adjusted savings: energy depletion (% of GNI)
Adjusted savings: mineral depletion (% of GNI)
Adjusted savings: net forest depletion (% of GNI)
Adjusted savings: net national savings (% of GNI)
Adjusted savings: particulate emission damage (% of GNI)

Economy

National accounts (local currency)

Agriculture, value added (constant LCU)
Agriculture, value added (current LCU)
Changes in inventories (constant LCU)
Changes in inventories (current LCU)
Discrepancy in expenditure estimate of GDP (constant LCU)
Discrepancy in expenditure estimate of GDP (current LCU)
Exports as a capacity to import (constant LCU)
Exports of goods and services (constant LCU)
Exports of goods and services (current LCU)
External balance on goods and services (constant LCU)
External balance on goods and services (current LCU)
Final consumption expenditure (constant LCU)
Final consumption expenditure (current LCU)
Final consumption expenditure, etc. (constant LCU)
Final consumption expenditure, etc. (current LCU)
GDP (constant LCU)
GDP (current LCU)
GDP per capita (constant LCU)
General government final consumption expenditure (constant LCU)

General government final consumption expenditure (current LCU)
GNI (current LCU)
Gross capital formation (constant LCU)
Gross capital formation (current LCU)
Gross domestic income (constant LCU)
Gross domestic savings (constant LCU)
Gross domestic savings (current LCU)
Gross fixed capital formation (constant LCU)
Gross fixed capital formation (current LCU)
Gross national expenditure (constant LCU)
Gross national expenditure (current LCU)
Gross national income (constant LCU)
Gross national savings, including NCTR (constant LCU)
Gross national savings, including NCTR (current LCU)
Gross value added at factor cost (constant LCU)
Gross value added at factor cost (current LCU)
Household final consumption expenditure (constant LCU)
Household final consumption expenditure (current LCU)
Household final consumption expenditure, etc. (constant LCU)
Household final consumption expenditure, etc. (current LCU)
Imports of goods and services (constant LCU)
Imports of goods and services (current LCU)
Industry, value added (constant LCU)
Industry, value added (current LCU)
Manufacturing, value added (constant LCU)
Manufacturing, value added (current LCU)
Net current transfers from abroad (constant LCU)
Net current transfers from abroad (current LCU)
Net income from abroad (constant LCU)
Net income from abroad (current LCU)
Net taxes on products (constant LCU)
Net taxes on products (current LCU)
Services, etc., value added (constant LCU)
Services, etc., value added (current LCU)
Terms of trade adjustment (constant LCU)

National accounts (US$)

Agriculture, value added (constant 2000 US$)
Agriculture, value added (current US$)
Changes in inventories (current US$)
DEC alternative conversion factor (LCU per US$)
Exports of goods and services (constant 2000 US$)
Exports of goods and services (current US$)
External balance on goods and services (current US$)
Final consumption expenditure (constant 2000 US$)

Final consumption expenditure (current US$)
Final consumption expenditure, etc. (constant 2000 US$)
Final consumption expenditure, etc. (current US$)
GDP (constant 2000 US$)
GDP (current US$)
GDP per capita (constant 2000 US$)
General government final consumption expenditure (constant 2000 US$)
General government final consumption expenditure (current US$)
GNI (current US$)
GNI per capita, Atlas method (current US$)
GNI, Atlas method (current US$)
Gross capital formation (constant 2000 US$)
Gross capital formation (current US$)
Gross domestic savings (current US$)
Gross fixed capital formation (constant 2000 US$)
Gross fixed capital formation (current US$)
Gross national expenditure (constant 2000 US$)
Gross national expenditure (current US$)
Gross national savings, including NCTR (current US$)
Gross value added at factor cost (constant 2000 US$)
Gross value added at factor cost (current US$)
Household final consumption expenditure (constant 2000 US$)
Household final consumption expenditure (current US$)
Household final consumption expenditure per capita (constant 2000 US$)
Household final consumption expenditure, etc. (constant 2000 US$)
Household final consumption expenditure, etc. (current US$)
Imports of goods and services (constant 2000 US$)
Imports of goods and services (current US$)
Industry, value added (constant 2000 US$)
Industry, value added (current US$)
Manufacturing, value added (constant 2000 US$)
Manufacturing, value added (current US$)
Net current transfers from abroad (current US$)
Net income from abroad (current US$)
Net taxes on products (current US$)
Services, etc., value added (constant 2000 US$)
Services, etc., value added (current US$)

Derived national accounts

Agriculture, value added (% of GDP)
Agriculture, value added (annual % growth)
Chemicals (% of value added in manufacturing)
Exports of goods and services (% of GDP)
Exports of goods and services (annual % growth)
External balance on goods and services (% of GDP)

Final consumption expenditure, etc. (% of GDP)
Final consumption expenditure, etc. (annual % growth)
Food, beverages and tobacco (% of value added in manufacturing)
GDP deflator (base year varies by country)
GDP growth (annual %)
GDP per capita growth (annual %)
General government final consumption expenditure (% of GDP)
General government final consumption expenditure (annual % growth)
Gross capital formation (% of GDP)
Gross capital formation (annual % growth)
Gross domestic savings (% of GDP)
Gross fixed capital formation (% of GDP)
Gross fixed capital formation (annual % growth)
Gross national expenditure (% of GDP)
Gross national savings, including NCTR (% of GDP)
Gross national savings, including NCTR (% of GNI)
Household final consumption expenditure (annual % growth)
Household final consumption expenditure per capita growth (annual %)
Household final consumption expenditure, etc. (% of GDP)
Household final consumption expenditure, etc. (annual % growth)
Imports of goods and services (% of GDP)
Imports of goods and services (annual % growth)
Industry, value added (% of GDP)
Industry, value added (annual % growth)
Machinery and transport equipment (% of value added in manufacturing)
Manufacturing, value added (% of GDP)
Manufacturing, value added (annual % growth)
Other manufacturing (% of value added in manufacturing)
Services, etc., value added (% of GDP)
Services, etc., value added (annual % growth)
Textiles and clothing (% of value added in manufacturing)
Trade (% of GDP)

Purchasing power parity

GDP per capita, PPP (constant 2000 international $)
GDP per capita, PPP (current international $)
GDP, PPP (constant 2000 international $)
GDP, PPP (current international $)
GNI per capita, PPP (current international $)
GNI, PPP (current international $)

Trade

Agricultural raw materials exports (% of merchandise exports)
Agricultural raw materials imports (% of merchandise imports)
Commercial service exports (current US$)
Commercial service imports (current US$)

Computer, communications and other services (% of commercial service exports)
Computer, communications and other services (% of commercial service imports)
Food exports (% of merchandise exports)
Food imports (% of merchandise imports)
Fuel exports (% of merchandise exports)
Fuel imports (% of merchandise imports)
Insurance and financial services (% of commercial service exports)
Insurance and financial services (% of commercial service imports)
Manufactures exports (% of merchandise exports)
Manufactures imports (% of merchandise imports)
Merchandise exports (current US$)
Merchandise imports (current US$)
Net barter terms of trade (2000 = 100)
Ores and metals exports (% of merchandise exports)
Ores and metals imports (% of merchandise imports)
Transport services (% of commercial service exports)
Transport services (% of commercial service imports)
Travel services (% of commercial service exports)
Travel services (% of commercial service imports)

Government finance

Cash surplus/deficit (% of GDP)
Cash surplus/deficit (current LCU)
Central government debt, total (% of GDP)
Central government debt, total (current LCU)
Compensation of employees (% of expense)
Compensation of employees (current LCU)
Expense (% of GDP)
Expense (current LCU)
Goods and services expense (% of expense)
Goods and services expense (current LCU)
Grants and other revenue (% of revenue)
Grants and other revenue (current LCU)
Interest payments (% of expense)
Interest payments (% of revenue)
Interest payments (current LCU)
Net incurrence of liabilities, domestic (% of GDP)
Net incurrence of liabilities, domestic (current LCU)
Net incurrence of liabilities, foreign (% of GDP)
Net incurrence of liabilities, foreign (current LCU)
Other expense (% of expense)
Other expense (current LCU)
Other taxes (% of revenue)

Other taxes (current LCU)
Revenue, excluding grants (% of GDP)
Revenue, excluding grants (current LCU)
Social contributions (% of revenue)
Social contributions (current LCU)
Subsidies and other transfers (% of expense)
Subsidies and other transfers (current LCU)
Taxes on goods and services (% of revenue)
Taxes on goods and services (current LCU)
Taxes on income, profits and capital gains (% of revenue)
Taxes on income, profits and capital gains (current LCU)
Taxes on international trade (% of revenue)
Taxes on international trade (current LCU)

Monetary

Claims on governments and other public entities (current LCU)
Claims on governments, etc. (annual growth as % of M2)
Claims on private sector (annual growth as % of M2)
Consumer price index (2000 = 100)
Food price index (2000 = 100)
Inflation, consumer prices (annual %)
Inflation, food prices (annual %)
Inflation, GDP deflator (annual %)
Money (current LCU)
Money and quasi money (M2) (current LCU)
Money and quasi money (M2) as % of GDP
Money and quasi money (M2) to gross international reserves ratio
Money and quasi money growth (annual %)
Net domestic credit (current LCU)
Net foreign assets (current LCU)
Quasi money (current LCU)

Balance of payments

Changes in net reserves (BoP, current US$)
Current account balance (% of GDP)
Current account balance (BoP, current US$)
Current transfers, receipts (BoP, current US$)
Exports of goods and services (BoP, current US$)
Exports of goods, services and income (BoP, current US$)
Foreign direct investment, net (BoP, current US$)
Goods exports (BoP, current US$)
Goods imports (BoP, current US$)
Imports of goods and services (BoP, current US$)
Imports of goods, services and income (BoP, current US$)
Income payments (BoP, current US$)
Income receipts (BoP, current US$)

Net capital account (BoP, current US$)
Net current transfers (BoP, current US$)
Net errors and omissions, adjusted (BoP, current US$)
Net income (BoP, current US$)
Net trade in goods (BoP, current US$)
Net trade in goods and services (BoP, current US$)
Portfolio investment, excluding LCFAR (BoP, current US$)
Service exports (BoP, current US$)
Service imports (BoP, current US$)
Total reserves (includes gold, current US$)
Total reserves in months of imports
Total reserves minus gold (current US$)
Workers' remittances and compensation of employees, received (US$)
Workers' remittances, receipts (BoP, current US$)

External debt

External debt, total (DOD, current US$)
IBRD loans and IDA credits (PPG DOD, current US$)
Long-term debt (DOD, current US$)
Multilateral debt service (% of public and publicly guaranteed debt service)
Present value of debt (% of exports of goods and services)
Present value of debt (% of GNI)
Private nonguaranteed debt (DOD, current US$)
Public and publicly guaranteed (PPG) debt (DOD, current US$)
Public and publicly guaranteed debt service (% of exports)
Public and publicly guaranteed debt service (% of GNI)
Public and publicly guaranteed debt service (TDS, current US$)
Short-term debt (% of total external debt)
Total debt service (% of exports of goods and services)
Total debt service (% of GNI)
Total debt service (TDS, current US$)
Use of IMF credit (DOD, current US$)

States & Markets

Investment and business

Average time to clear customs (days)
Business disclosure index (0=less disclosure to 7=more disclosure)
Corruption (% of managers surveyed ranking this as a major constraint)
Courts (% of managers surveyed lacking confidence in courts to uphold property rights)
Courts (% of managers surveyed ranking this as a major constraint)
Crime (% of managers surveyed ranking this as a major constraint)
Domestic credit to private sector (% of GDP)
Electricity (% of managers surveyed ranking this as a major constraint)
Finance (% of managers surveyed ranking this as a major constraint)

Foreign direct investment, net inflows (% of GDP)
Foreign direct investment, net inflows (% of gross capital formation)
Labor regulations (% of managers surveyed ranking this as a major constraint)
Labor skills (% of managers surveyed ranking this as a major constraint)
Legal rights of borrowers and lenders index (0=less credit access to 10=more access)
Listed domestic companies, total
Management time dealing with officials (% of management time)
Market capitalization of listed companies (% of GDP)
Market capitalization of listed companies (current US$)
Number of start-up procedures to register a business
Policy uncertainty (% of managers surveyed ranking this as a major constraint)
Private credit bureau coverage (borrowers per 1,000 adults)
Private investment in energy (current US$)
Private investment in telecoms (current US$)
Private investment in transport (current US$)
Private investment in water and sanitation (current US$)
Private nonguaranteed debt (% of external debt)
Procedures to enforce a contract
Procedures to register property
Public credit registry coverage (borrowers per 1,000 adults)
Rigidity of employment index (0=less rigid to 100=more rigid)
S&P/IFC investable index (annual % change)
Stocks traded, total value (% of GDP)
Stocks traded, turnover ratio (%)
Tax rates (% of managers surveyed ranking this as a major constraint)
Time to enforce a contract (days)
Time to register property (days)
Time to resolve insolvency (years)
Time to start a business (days)

Financial depth

Bank liquid reserves to bank assets ratio
Domestic credit provided by banking sector (% of GDP)
Interest rate spread (lending rate minus deposit rate)
Liquid liabilities (M3) as % of GDP
Quasi-liquid liabilities (% of GDP)
Risk premium on lending (%)

Tax and trade policies

Customs and other import duties (% of tax revenue)
Customs and other import duties (current LCU)
Highest marginal tax rate, corporate rate (%)
Highest marginal tax rate, individual (on income exceeding, US$)
Highest marginal tax rate, individual rate (%)
Tax revenue (% of GDP)
Tax revenue (current LCU)

Taxes on exports (% of tax revenue)
Taxes on exports (current LCU)
Taxes on goods and services (% value added of industry and services)
Taxes on income, profits and capital gains (% of total taxes)

Prices and exchange rates

Deposit interest rate (%)
Lending interest rate (%)
Official exchange rate (LCU per US$, period average)
PPP conversion factor to official exchange rate ratio
Purchasing power parity conversion factor (LCU per international $)
Real effective exchange rate index (2000 = 100)
Real interest rate (%)

Military expenditures and arms trade

Arms exports (constant 1990 US$)
Arms imports (constant 1990 US$)
Military expenditure (% of central government expenditure)
Military expenditure (% of GDP)
Military expenditure (current LCU)
Military personnel (% of total labor force)
Military personnel, total

Transport, power, and communications

Air transport, freight (million tons per km)
Air transport, passengers carried
Aircraft departures
Container port traffic (TEU: 20 foot equivalent units)
Electric power consumption (kwh per capita)
Electric power transmission and distribution losses (% of output)
Fixed line and mobile phone subscribers (per 1,000 people)
International telecom, outgoing traffic (minutes per subscriber)
Mobile phones (per 1,000 people)
Rail lines (total route-km)
Railways, good hauled (ton-km)
Railways, passengers carried (passenger-km)
Roads, goods transported (million ton-km)
Roads, paved (% of total roads)
Roads, total network (km)
Telephone average cost of call to US (US$ per three minutes)
Telephone average cost of local call (US$ per three minutes)
Telephone faults (per 100 mainlines)
Telephone mainlines (per 1,000 people)
Telephone mainlines in largest city (per 1,000 people)
Telephone mainlines per employee
Telephone mainlines, waiting list
Telephone revenue per mainline (current US$)

Information and technology
Cable television subscribers (per 1,000 people)
Daily newspapers (per 1,000 people)
High-technology exports (% of manufactured exports)
High-technology exports (current US$)
Information and communication technology expenditure (% of GDP)
Information and communication technology expenditure per capita (US$)
Internet total monthly price ($ per 20 hours of use)
Internet total monthly price (% of monthly GNI per capita)
Internet users (per 1,000 people)
Patent applications, nonresidents
Patent applications, residents
Personal computers (per 1,000 people)
Radios (per 1,000 people)
Research and development expenditure (% of GDP)
Researchers in R&D (per million people)
Royalty and license fees, payments (BoP, current US$)
Royalty and license fees, receipts (BoP, current US$)
Scientific and technical journal articles
Secure internet servers
Technicians in R&D (per million people)
Television sets (per 1,000 people)
Trademarks, nonresidents
Trademarks, residents

Global Links

Investment and trade
Gross foreign direct investment (% of GDP)
Gross private capital flows (% of GDP)
Ratio of commercial service exports to merchandise exports (%)
Trade in goods (% of GDP)
Trade in goods (% of goods GDP)
Financial flows
Bank and trade-related lending (PPG + PNG) (NFL, current US$)
Foreign direct investment, net inflows (BoP, current US$)
Net financial flows, IBRD (current US$)
Net financial flows, IDA (current US$)
Net financial flows, IMF concessional (current US$)
Net financial flows, IMF nonconcessional (current US$)
Net financial flows, others (current US$)
Net financial flows, RDB concessional (current US$)
Net financial flows, RDB nonconcessional (current US$)
Portfolio investment, bonds (PPG + PNG) (NFL, current US$)

Portfolio investment, equity (DRS, current US$)
Private capital flows, net total (DRS, current US$)
Development assistance and aid
Aid (% of central government expenditures)
Aid (% of GNI)
Aid (% of gross capital formation)
Aid (% of imports of goods and services)
Aid per capita (current US$)
Official development assistance and official aid (current US$)
Migration
International migration stock (% of population)
International migration stock, total
Net migration
Refugee population by country or territory of asylum
Refugee population by country or territory of origin
Travel and tourism
International tourism, expenditures (% of total imports)
International tourism, expenditures (current US$)
International tourism, number of arrivals
International tourism, number of departures
International tourism, receipts (% of total exports)
International tourism, receipts (current US$)

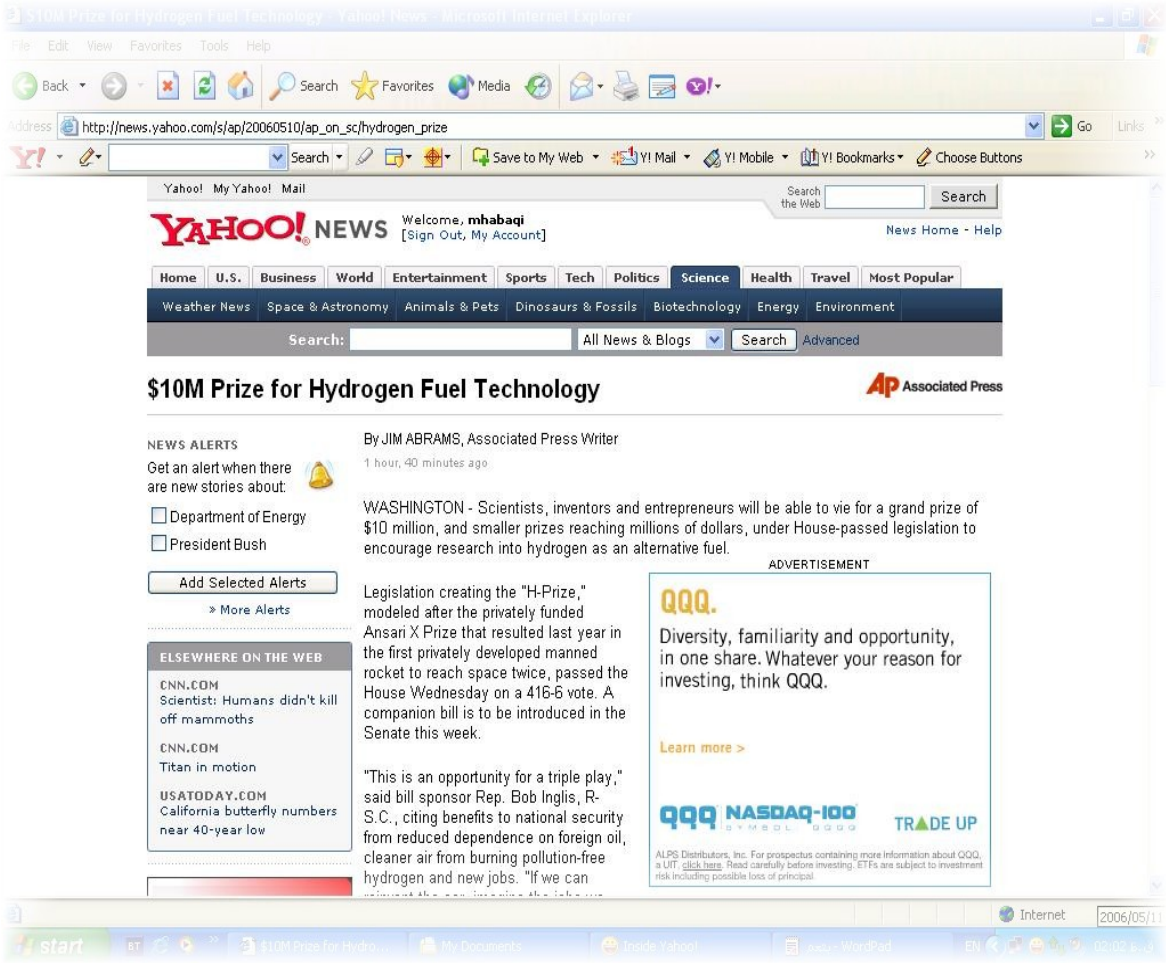
Source: World Bank, 2005. [on line], Available from:

http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20523397~menuPK:64133163~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html#economy

[Accessed 24/11/05].

$10M Prize for Hydrogen Fuel Technology

By ***JIM ABRAMS, Associated Press***



WASHINGTON - Scientists, inventors and entrepreneurs will be able to vie for a grand prize of $10 million, and smaller prizes reaching millions of dollars, under House-passed legislation to encourage research into ***hydrogen as an alternative fuel***.

Legislation creating the "H-Prize," modeled after the privately funded Ansari X Prize that resulted last year in the first privately developed manned rocket to reach space twice, passed the House Wednesday on a 416-6 vote. A companion bill is to be introduced in the Senate this week.

"This is an opportunity for a triple play," said bill sponsor Rep. Bob Inglis, R-S.C., citing benefits to ***national security from reduced dependence on foreign oil***, cleaner air from burning pollution-free hydrogen and new jobs. "If we can reinvent the car, imagine the jobs we can create."

"Perhaps the greatest role that the H-Prize may serve is in spurring the imagination of our most valuable resource, our youth," said co-sponsor Rep. Dan Lipinski, D-Ill.

The measure would award four prizes of up to $1 million every other year for technological advances in hydrogen production, storage, distribution and utilization. One prize of up to $4 million would be awarded every second year for the creation of a working hydrogen vehicle prototype.

The grand prize, to be awarded within the next 10 years, would go for breakthrough technology.

"Prizes can draw out new ideas from scientists and engineers who may not be willing or able to participate in traditional government research and development programs, while encouraging them, rather than the taxpayer, to assume the risk," said Science Committee Chairman Sherwood Boehlert, R-N.Y.

Inglis said the Department of Energy would put together a private foundation to set up guidelines and requirements for the prizes. Anyone can participate, as long as the research is performed in the United States and the person, if employed by the government or a national lab, does the research on his own time.

He said the prize would not take away funds from any federal hydrogen programs, including the $1.7 billion hydrogen research program that President Bush first detailed in

2003. The Energy Department announced earlier this year that it would provide $119 million in funding for research into hydrogen fuel cells, including $100 million over the next four years to projects to improve components of fuel cell systems.

Several automakers have made advances in hydrogen fuel cell technology or dual gas-hydrogen engines, but such vehicles are still very expensive and there's no viable infrastructure of fueling stations.

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The bill is H.R. 5143
On the Net:
Congress: http://thomas.loc.gov/

2006/05/11

Overview of research on the WTO in chronological order

Year	*Author (s)*	*Topic*	*Research Criteria*
1995	C. Hamilton & J. Whalley	Evaluating the impact of the Uruguay Round results on developing countries	Uruguay Round results Developing Countries
World Economy, Jan95, Vol. 18 Issue 1, p31, 19p, 1 chart; (*AN 9505032905*)			
1995	J. Pelkmans & A. G. Carzaniga	The trade policy review of the European Union	The European Union Trade policy
World Economy, Sep96 Supplement, Vol. 19 Issue 5, p81, 20p; (*AN 9703193343*)			
1996	Y. Yang	China's WTO membership: what's at stake?	Single country case: China WTO Membership
World Economy, Nov96, Vol. 19 Issue 6, p661, 22p, 8 charts; (*AN 9708021098*)			
*1996**	K. Anderson	Environmental and labour standards	Environment standards labour standards
*1996**	R. Blackhurst	The Capacity of the WTO to Fulfill its Mandate	WTO structure
*1996**	J. M. Finger & L. A. Winters	How can the WTO continue to help developing countries to integrate themselves into the international economy?	Developing Countries International economy
*1996**	J. Goldstein	International Institutions and Domestic Policies	International Institutions Domestic policies
*1996**	D. Henderson	International Agencies and Cross-Border Liberalization	International Institutions
*1996**	J. H. Jackson	WTO and Designing and implementing effective dispute settlement procedures	Dispute Settlement Procedures
*1996**	J. Pietras	The role of the WTO for economies in transition	Economies in transition

Overview of research on the WTO in chronological order – continued

Year	*Author (s)*	*Topic*	*Research Criteria*
*1996**	F. Roessler	Domestic Policy Objectives and the Multilateral Trade Order	Domestic policies
*1996**	T.N. Srinivasan	Regionalism and the WTO	Regionalism
*1996**	R. H. Snape	Reaching Effective Agreements Covering Services	GATS
* Source: Krueger, A. O., (ed) 2000. *The WTO as an International Organization*. Chicago: the University of Chicago Press.			
1997	B. Hoekman	Competition policy and the global trading system	Competition policy
World Economy, Jul97, Vol. 20 Issue 4, p383, 24p, 3 charts; (*AN 9710113660*)			
1997	K. E. Maskus	Implications of regional and multilateral agreements for intellectual property rights	Intellectual property rights
World Economy, Aug97, Vol. 20 Issue 5, p681, 14p, 2 charts; (*AN 9711166899*)			
1997	A. G. Guthbertson	The trade policy review of Sri Lanka	Single country case: Sri Lanka Trade policy
World Economy, Aug97, Vol. 20 Issue 5, p633, 16p; (*AN 9711166893*)			
1997	H. Hauser & R. Straw	Swiss trade policy and the 1996 WTO review	Single country case: Swiss Trade policy
World Economy, Aug97, Vol. 20 Issue 5, p665, 15p, 3 charts, 4 graphs; (*AN 9711166897*)			
1997	R. G. Flores	Brazilian trade policy and the WTO 1996 review	Single country case: Brazil Trade policy
World Economy, Aug97, Vol. 20 Issue 5, p615, 17p, 10 charts; (*AN 9711166891*)			

Overview of research on the WTO in chronological order – continued

Year	*Author (s)*	*Topic*	*Research Criteria*
1997	R. Blackhurst	The WTO and the global economy	Global economy
World Economy, Aug97, Vol. 20 Issue 5, p527, 18p; (*AN 9711166881*)			
1997	C. A. Pattichis	Cyprus and the Uruguay Round Agreement on Agriculture	Single country case: Cyprus Trade policy
World Economy, Sep97, Vol. 20 Issue 6, p845, 14p, 4 charts; (*AN 9711225824*)			
1997	J. S. Mah	Core labour standards and export performance in developing countries	Developing Countries labour standards
World Economy, Sep97, Vol. 20 Issue 6, p773, 13p, 4 charts; (*AN 9711225810*)			
1997	K. Anderson	On the complexities of China's WTO accession	Single country case: China WTO Membership
World Economy, Sep97, Vol. 20 Issue 6, p749, 24p, 1 chart; (*AN 9711225807*)			
1998	G. R. Winham	The World Trade Organisation institution-building in the multilateral trade system	Multilateral trade system
World Economy, May98, Vol. 21 Issue 3, p349, 20p; (*AN 980940*)			
1998	M. Richardson	New Zealand trade policy and the 1996 WTO review	Single country case: New Zealand Trade policy
World Economy, Jun98, Vol. 21 Issue 4, p529, 19p; (*AN 1031706*)			
1998	S. Rajapatirana	Colombian trade policies and the 1996 WTO trade policy review	Single country case: Colombia Trade policy
World Economy, Jun98, Vol. 21 Issue 4, p515, 13p; (*AN 1031705*)			
1998	R. M. Stern	The WTO trade policy review of the United States, 1996	Single country case: USA Trade policy
World Economy, Jun98, Vol. 21 Issue 4, p483, 32p, 5 charts; (*AN 1031704*)			

Overview of research on the WTO in chronological order – continued

Year	*Author (s)*	*Topic*	*Research Criteria*
1999	C. Michalopoulos	The developing countries in the WTO	Developing Countries
World Economy, Jan99, Vol. 22 Issue 1, p117, 27p, 4 charts; (*AN 1594906*)			
1999	A. Swinbank	EU agriculture, Agenda 2000 and the WTO commitments	The European Union Agriculture Sector
World Economy, Jan99, Vol. 22 Issue 1, p41, 14p, 1 chart; (*AN 1594903*)			
1999	Zhi Wang	The impact of China's WTO entry on the world labour-intensive export market	Single country case: China
World Economy, May99, Vol. 22 Issue 3, p379, 27p, 5 charts, 12 graphs; (*AN 1903638*)			
1999	Yongzheng Yang	Completing the WTO accession negotiations	WTO membership
World Economy, Jun99, Vol. 22 Issue 4, p513, 22p, 3 charts; (*AN 2206218*)			
1999	B. Hoekman P. Holmes	Competition policy, developing countries and the WTO	Developing Countries Competition policy
World Economy, Aug99, Vol. 22 Issue 6, p875, 18p, 1 chart; (*AN 2250371*)			
1999	R.J. Langhammer & M. Lucke	WTO accession issues	WTO membership
World Economy, Aug99, Vol. 22 Issue 6, p837, 34p, 3 charts; (*AN 2250370*)			
1999	P.K.M. Tharakan	Beyond transparency: An analysis of the trade policy review of the European Union	The European Union Trade policy
World Economy, Aug99, Vol. 22 Issue 6, p825, 12p, 1 graph; (*AN 2250369*)			
1999	A. Panagariya	The WTO trade policy review of India, 1998	Single country case: India Trade policy
World Economy, Aug99, Vol. 22 Issue 6, p799, 26p, 2 charts; (*AN 2250368*)			

Overview of research on the WTO in chronological order – continued

Year	*Author (s)*	*Topic*	*Research Criteria*
1999	S. Tangermann	Europe's agricultural policies and the Millennium Round	The European Union Agriculture Sector
World Economy, Dec99, Vol. 22 Issue 9, p1155, 24p, 13 graphs; (*AN 2600664*)			
2000	A. Mattoo	Financial services and the WTO: Liberalisation commitments of the developing and transition...	Developing Countries Economies in transition Financial services Sector
World Economy, Mar2000, Vol. 23 Issue 3, p351, 36p, 10 charts; (*AN 3067611*)			
2000	J. Rollo & L. A. Winters	Subsidiarity and Governance Challenges for the WTO: Environmental and Labour Standards	Environment standards labour standards
World Economy, Apr2000, Vol. 23 Issue 4, p561, 16p; (*AN 3112184*)			
2000	B. Bora, P.J.Lloyd & M. Pangestu	Industrial Policy and the WTO	Industrial Policy
World Economy, Apr2000, Vol. 23 Issue 4, p543, 17p; (*AN 3112182*)			
2000	B. Hoekman & P. C. Mavroidis	WTO Dispute Settlement, Transparency and Surveillance	Dispute Settlement Procedures
World Economy, Apr2000, Vol. 23 Issue 4, p527, 16p, 1 chart; (*AN 3112181*)			
2000	R. Chadha, B. Hoekman, W. Martin, A. Oyejide, M. Pangestu, D. Tussie & J. Zarrouk	Developing Countries and the Next Round of WTO Negotiations	Developing Countries WTO Next Round
World Economy, Apr2000, Vol. 23 Issue 4, p431, 6p; (*AN 3112171*)			

Overview of research on the WTO in chronological order – continued

Year	*Author (s)*	*Topic*	*Research Criteria*
2000	J. Watal	Pharmaceutical Patents, Prices and Welfare Losses: Policy Options for India Under the WTO TRIPS...	Single country case: India Pharmaceutical Sector TRIPS
World Economy, May2000, Vol. 23 Issue 5, p733, 20p, 6 charts; (*AN 3334281*)			
2000	C. VanGrasstek	US Plans for a New WTO Round: Negotiating More Agreements with Less Authority	Single country case: USA Next WTO Round
World Economy, May2000, Vol. 23 Issue 5, p673, 28p, 3 charts; (*AN 3334278*)			
*2000***	T. L. Brewer & S. Young	The USA in the WTO	Single country case: USA
*2000***	J. B. Davis & J. P. Daniels	Corporations and structural linkages in world commerce	Foreign Direct Investment
*2000***	T. Ozawa	Japan in the WTO	Single country case: Japan
*2000***	N. Pain	Openness,growth and development: Trade and investment issues for developing economies	Developing countries Openness
*2000***	R. H. Pedler	The EU in the WTO	The European Union
*2000***	G. Winham & A. Lanoszka	Institutional development of the WTO	WTO structure
** Source: Rugman, A. M. , & Boyd, G., (ed) 2001. *The World Trade Organization in the New Global Economy*. Cheltenham: Edward Elgar.			
2000	A. Panagariya	E-Commerce, WTO and Developing Countries	Developing Countries E-Commerce Sector
World Economy, Aug2000, Vol. 23 Issue 8, p959, 20p, 2 graphs; (*AN 4335883*)			

Overview of research on the WTO in chronological order – continued

Year	*Author (s)*	*Topic*	*Research Criteria*
2000	K. Stegemann	The Integration of Intellectual Property Rights into the WTO System	Intellectual Property Rights
World Economy, Sep2000, Vol. 23 Issue 9, p1237, 31p, 3 charts; (*AN 4336127*)			
2000	P. G. Warr	Thailand's Post-crisis Trade Policies: The 1999 WTO Review	Single country case: Thailand Trade policy
World Economy, Sep2000, Vol. 23 Issue 9, p1215, 22p, 7 charts; (*AN 4336128*)			
2000	J. Berlinski	The WTO Trade Policy Review of Argentina, 1999	Single country case: Argentina Trade policy
World Economy, Sep2000, Vol. 23 Issue 9, p1195, 19p, 6 charts; (*AN 4336129*)			
2000	R. Sally	Developing Country Trade Policy Reform and the WTO	Developing Countries Trade policy
CATO Journal; Winter2000, Vol. 19 Issue 3, p403, 21p, *(AN 3286245)*			
2001	N. Perdikis W. A.K.Shelburne & J. E. Hobbs	Reforming the WTO to Defuse Potential Trade Conflicts in Genetically Modified Goods	Genetically Modified Goods Sector
World Economy, Mar2001, Vol. 24 Issue 3; (*AN 4550059*)			
2001	S. Panitchpakdi	GLOBAL TRADE LIBERALISATION: COORDINATION AND COHERENCE	Developing Countries Trade Liberalisation
Australian Economic Review; Mar2001, Vol. 34 Issue 1, p3, 11p			
2001	A.C. Bosch	EU and WTO perspectives/ coming to terms with the banana trade.	The European Union Agriculture Sector
Source: Bosch, A.C., 2001. *EU and WTO perspectives/coming to terms with the banana trade*. Birmingham: the University of Birmingham. ML2001.PhD/B.			
2001	S. M. Pekkanen	Aggressive Legalism: The Rules of the WTO and Japan's Emerging Trade Strategy	Single country case: Japan Trade Strategy
World Economy, May2001, Vol. 24 Issue 5; (*AN 4890196*)			

Overview of research on the WTO in chronological order – continued

Year	*Author (s)*	*Topic*	*Research Criteria*
2001	T. L. Walmsley & T. W. Hertel	China's Accession to the WTO: Timing is Everything	Single country case: China WTO Membership
World Economy, Aug2001, Vol. 24 Issue 8, p1019, 31p; (*AN 5326853*)			
2001	J. Waincymer	Settlement of Disputes Within the World Trade Organisation	Dispute Settlement Procedures
World Economy, Sep2001, Vol. 24 Issue 9, p1247, 32p; (*AN 5589289*)			
2001	W. Martin & E. Ianchovichina	Implications of China's Accession to the World Trade Organisation for China and the WTO	Single country case: China WTO Membership
World Economy, Sep2001, Vol. 24 Issue 9, p1205, 15p; (*AN 5589291*)			
2001	R. Scollay	The Changing Outlook for Asia-Pacific Regionalism	Regionalism
World Economy, Sep2001, Vol. 24 Issue 9, p1135, 26p; (*AN 5589294*)			
2001	J. M. Finger	Implementing the Uruguay Round Agreements: Problems for Developing Countries	Developing Countries Uruguay Round
World Economy, Sep2001, Vol. 24 Issue 9, p1097, 12p; (*AN 5589296*)			
2002	S. McCorriston & D. MacLaren	State Trading, the WTO and GATT Article XVII	WTO rules
World Economy, Jan2002, Vol. 25 Issue 1, p107, 29p, 5 charts; (*AN 5935641*)			
2002	M. Feldman & R. Sally	From the Soviet Union to the European Union: Estonian Trade Policy, 1991–2000	Single country case: Estonia The European Union
World Economy, Jan2002, Vol. 25 Issue 1, p79, 28p, 5 charts; (*AN 5935642*)			
2002	W. A. Kerr & J. E. Hobbs	The North American–European Union Dispute Over Beef Produced Using Growth Hormones: A Major Test for the New International Trade Regime	The European Union Dispute Settlement Procedures
World Economy, Feb2002, Vol. 25 Issue 2, p283, 14p; (*AN 6194813*)			

Overview of research on the WTO in chronological order – continued

Year	*Author (s)*	*Topic*	*Research Criteria*
2002	S. Suranovic	International Labour and Environmental Standards Agreements: Is This Fair Trade?	Environment standards labour standards
World Economy, Feb2002, Vol. 25 Issue 2, p231, 15p; (*AN 6194816*)			
2002	J. M. Finger & J. J. Nogués	The Unbalanced Uruguay Round Outcome: The New Areas in Future WTO Negotiations	Uruguay Round Outcome
World Economy, Mar2002, Vol. 25 Issue 3, p321, 20p; (*AN 6183462*)			
2002	N. Pavcnik	Trade Disputes in the Commercial Aircraft Industry	Dispute Settlement Procedures Commercial Aircraft Industry
World Economy, May2002, Vol. 25 Issue 5, p733, 19p; (*AN 6721035*)			
2002	S. J. La Croix & D. Eby Konan	Intellectual Property Rights in China	Intellectual Property Rights Single country case: China
World Economy, Jun2002, Vol. 25 Issue 6, p759, 30p; (*AN 6778544*)			
2002	G. Hufbauer, B. Kotschwar & J. Wilson	Trade and Standards: A Look at Central America	Central America
World Economy, Jul2002, Vol. 25 Issue 7, p991, 28p; (*AN 7105744*)			
2002	M. Schiff	Chile's Trade and Regional Integration Policy: An Assessment	Single country case: Chile Trade policy
World Economy, Jul2002, Vol. 25 Issue 7, p973, 18p; (*AN 7105745*)			
2002	J. P. Bonin & Y. Huang	Foreign Entry into Chinese Banking: Does WTO Membership Threaten Domestic Banks?	Single country case: China Banking Sector
World Economy, Aug2002, Vol. 25 Issue 8, p1077, 17p; (*AN 7275919*)			

Overview of research on the WTO in chronological order – continued

Year	*Author (s)*	*Topic*	*Research Criteria*
2002	P. Athukorala	Malaysian Trade Policy and the 2001 WTO Trade Policy Review	Single country case: Malaysia Trade policy
World Economy, Sep2002, Vol. 25 Issue 9, p1297, 21p; (*AN 8688084*)			
2002	S. Prowse	The Role of International and National Agencies in Trade–related Capacity Building	International Agencies
World Economy, Sep2002, Vol. 25 Issue 9, p1235, 27p; (*AN 8688087*)			
2003	G. E. Isaac & W. A. Kerr	Genetically Modified Organisms and Trade Rules: Identifying Important Challenges for the WTO	Genetically Modified Goods Sector
World Economy, Jan2003, Vol. 26 Issue 1, p29, 14p; (*AN 9140994*)			
2003	V. Murinde & C. Ryan	The Implications of WTO and GATS for the Banking Sector in Africa	Banking Sector Africa
World Economy, Feb2003, Vol. 26 Issue 2, p181, 27p; DOI: 10.1111/1467-9701.00517; (*AN 9412502*)			
2003	T. Kelly	The WTO, the Environment and Health and Safety Standards	Environment standards Health and Safety standards
World Economy, Feb2003, Vol. 26 Issue 2, p131, 21p; DOI: 10.1111/1467-9701.00515; (*AN 9412506*)			
2003	R. E. Feinberg	The Political Economy of United States' Free Trade Arrangements	Single country case: USA
World Economy, Jul2003, Vol. 26 Issue 7, p1019, 22p; DOI: 10.1111/1467-9701.00561; (*AN 10763656*)			
2003	P. Athukorala & S. Jayasuriya	Food Safety Issues, Trade and WTO Rules: A Developing Country Perspective	Developing Countries Food Sector
World Economy, Sep2003, Vol. 26 Issue 9, p1395, 22p; DOI: 10.1046/j.1467-9701.2003.00576.x; (*AN 11397819*)			

Overview of research on the WTO in chronological order – continued

Year	*Author (s)*	*Topic*	*Research Criteria*
2003	V. N. Balasubramanyam	India: Trade Policy Review	Single country case: India Trade policy
World Economy, Sep2003, Vol. 26 Issue 9, p1357, 12p; DOI: 10.1046/j.1467-9701.2003.00577.x; (*AN 11397818*)			
2004	C. P. Bown	Developing Countries as Plaintiffs and Defendants in GATT/WTO Trade Disputes	Developing Countries Dispute Settlement Procedures
World Economy, Jan2004, Vol. 27 Issue 1, p59, 22p; DOI: 10.1111/j.1467-9701.2004.00588.x; (*AN 12127987*)			
2004	M. Zanardi	Anti-dumping: What are the Numbers to Discuss at Doha?	Anti-dumping
World Economy, Mar2004, Vol. 27 Issue 3, p403, 31p; DOI: 10.1111/j.1467-9701.2004.00605.x; (*AN 12389965*)			
2004	Z. Zhang & L. Assunção	Domestic Climate Policies and the WTO	Domestic Policies
World Economy, Mar2004, Vol. 27 Issue 3, p359, 28p; DOI: 10.1111/j.1467-9701.2004.00603.x; (*AN 12389967*)			
2004	A. Bhattacharjea	Export Cartels--A *Developing Country* Perspective	Developing Country Export Cartels
Journal of World Trade; Apr2004, Vol. 38 Issue 2, p331, 29p; *(AN 14491019)*			
2004	P. Athukorala	Trade Policy Making in a Small Island Economy: The WTO Review of the Maldives	Single country case: Maldives Trade Policy
World Economy, Sep2004, Vol. 27 Issue 9, p1401, 19p; DOI: 10.1111/j.0378-5920.2004.00658.x; (*AN 14641750*)			
2004	K. Head & J. Ries	Regionalism Within Multilateralism: The WTO Trade Policy Review of Canada	Single country case: Canada Regionalism Multilateralism
World Economy, Sep2004, Vol. 27 Issue 9, p1377, 23p; DOI: 10.1111/j.0378-5920.2004.00657.x; (*AN 14641751*)			

Overview of research on the WTO in chronological order – continued

Year	*Author (s)*	*Topic*	*Research Criteria*
2004	C. Milner	Trade Policy in Burundi: Reform Without Political Stability	Single country case: Burundi Trade Policy
World Economy, Sep2004, Vol. 27 Issue 9, p1363, 14p; DOI: 10.1111/j.0378-5920.2004.00656.x; (*AN 14641752*)			
2004	C. Liang	The Effect of Entering the WTO on the Oil Industry and the Economy of Taiwan	Single country case: Taiwan Oil Industry
World Economy, Nov2004, Vol. 27 Issue 10, p1537, 18p; DOI: 10.1111/j.1467-9701.2004.00665.x; (*AN 15275406*)			
2005	J. S. Mah & C. Milner	The Japanese Export Insurance Arrangements: Promotion or Subsidisation?	Single country case: Japan Insurance Sector
World Economy, Feb2005, Vol. 28 Issue 2, p231, 11p; DOI: 10.1111/j.1467-9701.2005.00680.x; (*AN 15916846*)			
2005	A. Sawhney	Quality Measures in Food Trade: The Indian Experience	Single country case: India Food Sector
World Economy, Mar2005, Vol. 28 Issue 3, p329, 20p; DOI: 10.1111/j.1467-9701.2005.00670.x; (*AN 16379585*)			
2005	A. Mahmood	WTO and Market Access in Non-Agricultural Products: Issues and Options for Developing Countries	Developing Countries Textile Sector
Journal of American Academy of Business, Cambridge; Mar2005, Vol. 6 Issue 1, p1, 11p; *(AN 15637337)*			

The brief results of OILPRODUCTION Bivariate relationship for sample nations

Nation	*Bivariate Test*	R^2	*Adj* R^2	R	β_0	β_1	$Se\beta_0$	$Se\beta_1$	df	$t\beta_0$	$t\beta_1$	F	*ESS*	*RSS*
Algeria	OilPro-XC	0.727	0.709	0.852	–10.497	36.161	2.462	5.546	16	–4.264	6.520	42.511	57.821	21.762
Algeria	OilPro-XO	0.598	0.573	0.773	–12.883	45.443	4.136	9.318	16	–3.115	4.877	23.786	91.310	61.422
Algeria	OilPro-TE	0.669	0.649	0.818	–23.38	81.604	6.363	14.336	16	–3.674	5.692	32.402	294.454	145.4
Angola	OilPro-XC	0.758	0.743	0.871	–2.155	27.188	0.886	3.842	16	–2.433	7.076	50.076	52.367	16.732
Angola	OilPro-XO	0.389	0.351	0.624	0.029	2.131	0.154	0.668	16	*0.187*	3.193	10.193	0.322	0.505
Angola	OilPro-TE	0.772	0.758	0.879	–2.126	29.319	0.917	3.978	16	–2.319	7.371	54.329	60.899	17.935
Brunei	OilPro-XC	0.218	0.170	0.467	–0.349	25.229	0.711	11.933	16	*–0.492*	*2.114*	*4.470*	0.413	1.478
Brunei	OilPro-XO	0.275	0.230	0.524	–0.502	31.141	0.753	12.644	16	*–0.667*	2.463	6.066	0.629	1.659
Brunei	OilPro-TE	0.276	0.231	0.526	–0.852	56.371	1.359	22.809	16	*–0.627*	2.471	6.108	2.061	5.400
Cameroon	OilPro-XC	0.243	0.196	0.493	1.139	–10.813	0.225	4.772	16	5.061	–2.266	5.135	0.354	1.102
Cameroon	OilPro-XO	0.173	0.121	0.416	1.305	–7.799	0.201	4.267	16	6.483	*–1.827*	*3.340*	0.184	0.881
Cameroon	OilPro-TE	0.349	0.309	0.591	2.444	–18.61	0.3	6.35	16	8.16	–2.931	8.589	1.048	1.951
Congo	OilPro-XC	0.576	0.550	0.759	0.140	11.773	0.191	2.523	16	*0.731*	4.666	21.769	0.880	0.647
Congo	OilPro-XO	0.637	0.615	0.798	–0.302	7.969	0.114	1.503	16	–2.659	5.304	28.132	0.403	0.229
Congo	OilPro-TE	0.728	0.711	0.853	–0.163	19.743	0.228	3.016	16	*–0.713*	6.547	42.862	2.476	0.924
Ecuador	OilPro-XC	0.521	0.492	0.722	–0.466	14.299	0.437	3.424	16	*–1.066*	4.176	17.438	1.823	1.673
Ecuador	OilPro-XO	0.705	0.687	0.840	–1.782	33.584	0.693	5.427	16	–2.572	6.188	38.290	10.056	4.202
Ecuador	OilPro-TE	0.783	0.770	0.885	–2.249	47.883	0.804	6.300	16	–2.795	7.60	57.763	20.442	5.662
Egypt	OilPro-XC	0.215	0.166	0.463	–0.967	5.412	0.788	2.588	16	*–1.227*	*2.091*	*4.373*	0.574	2.099
Egypt	OilPro-XO	0.638	0.615	0.799	11.099	–27.483	1.576	5.178	16	7.042	–5.308	28.174	14.795	8.402
Egypt	OilPro-TE	0.527	0.497	0.726	10.132	–22.07	1.593	5.232	16	6.362	–4.219	17.796	9.542	8.579
Gabon	OilPro-XC	0.758	0.741	0.871	–0.080	18.238	0.300	2.755	14	*–0.266*	6.620	43.824	3.144	1.004
Gabon	OilPro-XO	0.029	–0.040	0.170	0.371	0.766	0.129	1.184	14	2.879	*0.646*	*0.418*	0.006	0.186
Gabon	OilPro-TE	0.604	0.579	0.777	0.444	18.091	0.387	3.662	16	*1.147*	4.94	24.403	3.804	2.494
Iran	OilPro-XC	0.340	0.296	0.583	–4.450	17.160	7.654	6.178	15	*–0.581*	2.777	7.714	143.485	279.002
Iran	OilPro-XO	0.655	0.632	0.809	–4.021	5.839	1.357	1.095	15	–2.965	5.333	28.439	16. 613	8.763
Iran	OilPro-TE	0.542	0.514	0.736	–9.668	23.929	6.685	5.495	16	*–1.446*	4.355	18.965	405.971	342.51
Kuwait	OilPro-XC	0.581	0.554	0.762	–1.759	12.964	1.789	2.755	16	*–0.983*	4.706	22.145	94.921	68.582
Kuwait	OilPro-XO	0.682	0.662	0.826	–0.672	9.265	1.028	1.582	16	*–0.654*	5.856	34.287	48.482	22.624
Kuwait	OilPro-TE	0.688	0.668	0.829	–2.431	22.229	2.431	3.743	16	*–1.000*	5.939	35.277	279.079	126.576

The brief results of OILPRODUCTION Bivariate relationship for sample nations

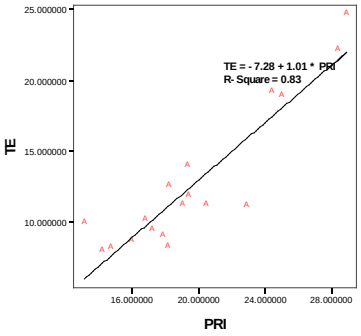
Nation	*Bivariate Test*	R^2	*Adj* R^2	R	β_0	β_1	$Se\beta_0$	$Se\beta_1$	df	$t\beta_0$	$t\beta_1$	F	*ESS*	*RSS*
Libya	OilPro-XC	0.142	0.089	0.377	1.940	12.189	3.636	7.481	16	*0.533*	*1.629*	*2.655*	7.002	42.201
Libya	OilPro-XO	0.410	0.373	0.640	–0.805	5.489	0.800	1.645	16	*–1.006*	3.336	11.128	1.420	2.041
Libya	OilPro-TE	0.221	0.173	0.470	1.135	17.678	4.031	8.293	16	*0.282*	2.132	4.544	14.727	51.858
Nigeria	OilPro-XC	0.472	0.389	0.654	–16.445	40.413	8.703	12.077	15	*–1.890*	3.346	11.197	235.506	315.501
Nigeria	OilPro-XO	0.002	–0.064	0.047	0.435	0.212	0.841	1.167	15	*0.517*	*0.182*	*0.033*	0.006	2.944
Nigeria	OilPro-TE	0.472	0.439	0.687	–15.88	40.450	7.615	10.702	16	–2.085	3.780	14.285	285.576	319.854
Norway	OilPro-XC	0.743	0.726	0.862	–3.682	22.432	3.018	3.302	16	*–1.220*	6.793	46.149	813.774	282.136
Norway	OilPro-XO	0.784	0.770	0.885	8.184	19.371	2.324	2.543	16	3.521	7.617	58.014	606.852	167.368
Norway	OilPro-TE	0.790	0.777	0.889	4.502	41.802	4.922	5.385	16	*0.915*	7.763	60.259	2826.102	750.386
Oman	OilPro-XC	0.555	0.527	0.745	–3.195	28.646	1.866	6.415	16	*–1.712*	4.465	19.940	30.906	24.800
Oman	OilPro-XO	0.565	0.538	0.752	–3.528	17.625	1.125	3.868	16	–3.135	4.557	20.767	11.700	9.014
Oman	OilPro-TE	0.605	0.580	0.778	–6.722	46.272	2.720	9.351	16	–2.471	4.948	24.487	80.639	52.690
Qatar	OilPro-XC	0.637	0.614	0.798	–0.843	19.943	0.725	3.766	16	*–1.163*	5.295	28.035	21.740	12.408
Qatar	OilPro-XO	0.761	0.746	0.872	–3.287	29.880	0.805	4.185	16	–4.081	7.139	50.970	48.804	15.320
Qatar	OilPro-TE	0.755	0.740	0.869	–4.130	49.822	1.366	7.097	16	–3.024	7.020	49.283	135.691	44.052
S. Arabia	OilPro-XC	0.579	0.553	0.761	–19.340	20.684	12.054	4.405	16	*–1.604*	4.695	22.043	2130.875	1546.696
S. Arabia	OilPro-XO	0.518	0.488	0.720	–1.811	5.234	3.452	1.262	16	*–0.525*	4.149	17.216	136.461	126.824
S. Arabia	OilPro-TE	0.615	0.591	0.784	–21.15	25.918	14.021	5.124	16	*–1.509*	5.058	25.583	3345.817	2092.55
Syria	OilPro-XC	0.375	0.336	0.613	–0.621	15.514	0.867	5.004	16	*–0.717*	3.100	9.610	8.331	13.870
Syria	OilPro-XO	0.045	–0.015	0.211	1.212	2.310	0.462	2.669	16	2.621	*0.865*	*0.749*	0.185	3.947
Syria	OilPro-TE	0.325	0.283	0.570	0.591	17.823	1.112	6.421	16	*0.531*	2.776	7.705	10.996	22.833
UAE	OilPro-XC	0.564	0.537	0.751	–6.407	23.809	4.050	5.231	16	*–1.582*	4.551	20.715	126.872	97.994
UAE	OilPro-XO	0.346	0.305	0.588	–27.810	61.274	16.304	21.057	16	*–1.706*	2.910	8.467	840.301	1587.833
UAE	OilPro-TE	0.417	0.380	0.646	–34.22	85.038	19.479	25.158	16	*–1.757*	3.382	11.438	1620.197	2266.42
Venezuela	OilPro-XC	0.151	0.098	0.389	1.066	10.562	5.863	6.262	16	*0.182*	*1.687*	*2.854*	60.852	342.254
Venezuela	OilPro-XO	0.716	0.698	0.846	–3.586	12.396	1.827	1.951	16	*–1.963*	6.353	40.362	83.817	33.226
Venezuela	OilPro-TE	0.508	0.477	0.713	–2.520	22.958	5.288	5.649	16	*–0.477*	4.064	16.518	287.502	278.483
Yemen	OilPro-XC	0.766	0.746	0.875	–1.730	28.311	0.580	4.518	12	–2.981	6.266	39.260	14.409	4.404
Yemen	OilPro-XO	0.380	0.329	0.617	–0.091	2.761	0.131	1.017	12	*–0.695*	2.714	7.366	0.137	0.223
Yemen	OilPro-TE	0.742	0.726	0.861	–0.843	23.488	0.401	3.464	16	*–2.105*	6.780	45.967	24.877	8.659

The brief results of PRICE Bivariate relationship for sample nations

Nation	*Bivariate Test*	R^2	*Adj* R^2	R	β_0	β_1	$Se\beta_0$	$Se\beta_1$	df	$t\beta_0$	$t\beta_1$	F	*ESS*	*RSS*
Algeria	Price-XC	0.873	0.865	0.934	–3.215	0.441	0.848	0.042	16	–3.792	10.483	109.89	69.468	10.114
Algeria	Price-XO	0.762	0.747	0.873	–4.061	0.571	1.606	0.080	16	–2.528	7.163	51.310	116.427	36.305
Algeria	Price-TE	0.832	0.821	0.912	–7.275	1.012	2.295	0.114	16	–3.170	8.887	78.986	365.762	74.092
Angola	Price-XC	0.808	0.796	0.899	–3.897	0.396	0.970	0.048	16	–4.017	8.214	67.472	55.854	13.245
Angola	Price-XO	0.204	0.154	0.452	0.074	0.022	0.216	0.011	16	*0.343*	*2.026*	*4.106*	0.169	0.658
Angola	Price-TE	0.789	0.775	0.888	–3.823	0.417	1.088	0.054	16	–3.513	7.725	59.671	62.165	16.669
Brunei	Price-XC	0.663	0.642	0.814	–0.018	0.059	0.213	0.011	16	*–0.086*	5.611	31.479	1.254	0.637
Brunei	Price-XO	0.441	0.406	0.664	0.299	0.053	0.302	0.015	16	*0.993*	3.551	12.608	1.009	1.280
Brunei	Price-TE	0.605	0.580	0.778	0.281	0.112	0.458	0.023	16	*0.614*	4.946	24.465	4.511	2.95
Cameroon	Price-XC	0.330	0.288	0.575	–0.072	0.037	0.263	0.013	16	*–0.274*	2.808	7.887	0.481	0.975
Cameroon	Price-XO	0.154	0.101	0.392	0.530	0.021	0.253	0.013	16	*2.095*	*1.706*	*2.909*	0.164	0.901
Cameroon	Price-TE	0.402	0.365	0.634	0.458	0.058	0.357	0.018	16	*1.283*	3.280	10.756	1.206	1.793
Congo	Price-XC	0.621	0.597	0.788	–0.010	0.052	0.203	0.010	16	*–0.048*	5.118	26.199	0.948	0.579
Congo	Price-XO	0.324	0.281	0.569	–0.189	0.024	0.174	0.009	16	*–1.083*	2.768	7.660	0.205	0.428
Congo	Price-TE	0.598	0.573	0.774	–0.199	0.076	0.312	0.015	16	*–0.638*	4.884	23.849	2.035	1.365
Ecuador	Price-XC	0.789	0.775	0.888	–0.395	0.088	0.229	0.011	16	*–1.725*	7.726	59.694	2.757	0.739
Ecuador	Price-XO	0.129	0.075	0.359	1.028	0.072	0.939	0.047	16	*1.059*	*1.541*	*2.374*	1.842	12.415
Ecuador	Price-TE	0.349	0.308	0.591	0.633	0.160	1.099	0.055	16	*0.567*	2.928	8.572	9.107	16.998
Egypt	Price-XC	0.042	–0.017	0.206	1.022	–0.018	0.427	0.021	16	2.395	*–0.842*	*0.710*	0.114	2.560
Egypt	Price-XO	0.567	0.539	0.753	–0.988	0.192	0.845	0.042	16	*–1.169*	4.573	20.912	13.142	10.055
Egypt	Price-TE	0.597	0.572	0.772	0.033	0.174	0.721	0.036	16	*0.046*	4.866	23.674	10.813	7.308
Gabon	Price-XC	0.046	–0.022	0.215	1.307	0.028	0.679	0.034	14	*1.925*	*0.824*	*0.678*	0.192	3.957
Gabon	Price-XO	0.020	–0.050	0.141	0.375	0.004	0.148	0.007	14	2.540	*0.532*	*0.283*	0.004	0.187
Gabon	Price-TE	0.209	0.160	0.457	1.105	0.061	0.595	0.030	16	*1.858*	*2.057*	*4.233*	1.318	4.981
Iran	Price-XC	0.837	0.827	0.915	–4.231	1.044	2.427	0.119	15	*–1.743*	8.791	77.273	353.807	68.680
Iran	Price-XO	0.249	0.199	0.499	0.359	0.139	1.278	0.063	15	*0.281*	2.231	4.975	6.320	19.055
Iran	Price-TE	0.770	0.756	0.878	–5.913	1.271	3.497	0.174	16	*–1.691*	7.32	53.587	576.383	172.097
Kuwait	Price-XC	0.494	0.462	0.703	–3.006	0.476	2.425	0.120	16	*–1.239*	3.952	15.619	80.766	82.737
Kuwait	Price-XO	0.252	0.205	0.502	0.712	0.224	1.944	0.0.96	16	*0.366*	2.323	5.396	17.934	53.172
Kuwait	Price-TE	0.431	0.395	0.656	–2.294	0.700	4.051	0.201	16	*–0.566*	3.481	12.117	174.816	230.839

The brief results of PRICE Bivariate relationship for sample nations

Nation	*Bivariate Test*	R^2	*Adj* R^2	R	β_0	β_1	$Se\beta_0$	$Se\beta_1$	df	$t\beta_0$	$t\beta_1$	F	*ESS*	*RSS*
Libya	Price-XC	0.316	0.273	0.562	3.730	0.209	1.547	0.077	16	2.412	2.719	7.395	15.552	33.651
Libya	Price-XO	0.200	0.150	0.447	0.983	0.044	0.444	0.022	16	2.216	*1.999*	*3.996*	0.692	2.769
Libya	Price-TE	0.342	0.301	0.585	4.713	0.253	1.764	0.088	16	2.672	2.887	8.334	22.804	43.781
Nigeria	Price-XC	0.773	0.758	0.879	–10.437	1.145	3.272	0.160	15	–3.190	7.156	51.209	426.173	124.834
Nigeria	Price-XO	0.048	–0.016	0.219	0.169	0.021	0.491	0.024	15	*0.345*	*0.869*	*0.756*	0.142	2.809
Nigeria	Price-TE	0.808	0.796	0.899	–10.380	1.171	2.872	0.143	16	3.614	8.214	67.472	489.380	116.050
Norway	Price-XC	0.711	0.693	0.843	–13.355	1.478	4.741	0.235	16	–2.817	6.281	39.450	779.688	316.222
Norway	Price-XO	0.503	0.472	0.709	4.389	1.044	5.231	0.260	16	*0.839*	4.022	16.177	389.239	384.982
Norway	Price-TE	0.635	0.612	0.797	–8.966	2.522	9.634	0.478	16	*–0.931*	5.275	27.824	2270.716	1305.77
Oman	Price-XC	0.835	0.824	0.914	–2.057	0.361	0.809	0.040	16	–2.541	8.984	80.710	46.490	9.216
Oman	Price-XO	0.444	0.409	0.666	–1.617	0.160	0.905	0.045	16	*–1.787*	3.572	12.761	9.191	11.524
Oman	Price-TE	0.728	0.711	0.853	–3.674	0.521	1.606	0.080	16	–2.287	6.539	42.758	97.022	36.306
Qatar	Price-XC	0.525	0.495	0.725	–1.569	0.224	1.074	0.053	16	*–1.461*	4.205	17.679	17.925	16.223
Qatar	Price-XO	0.637	0.614	0.798	–4.423	0.338	1.287	0.064	16	–3.436	5.294	28.026	40.820	23.304
Qatar	Price-TE	0.628	0.605	0.792	–5.992	0.562	2.181	0.108	16	–2.748	5.195	26.989	112.845	66.898
S. Arabia	Price-XC	0.723	0.706	0.851	–17.446	2.730	8.503	0.422	16	*–2.052*	6.469	41.849	2660.426	1017.145
S. Arabia	Price-XO	0.391	0.353	0.625	1.692	0.537	3.376	0.168	16	*0.501*	3.205	10.271	102.935	160.350
S. Arabia	Price-TE	0.701	0.682	0.837	–15.75	3.267	10.758	0.534	16	*–1.464*	6.118	37.436	3809.975	1628.39
Syria	Price-XC	0.611	0.587	0.782	–1.854	0.195	0.783	0.039	16	–2.367	5.017	25.173	13.573	8.627
Syria	Price-XO	0.233	0.185	0.483	0.578	0.052	0.475	0.024	16	*1.218*	2.205	4.862	0.963	3.168
Syria	Price-TE	0.643	0.621	0.802	–1.275	0.247	0.926	0.046	16	*–1.377*	5.373	28.869	21.766	12.063
UAE	Price-XC	0.806	0.794	0.898	–2.169	0.713	1.760	0.087	16	*–1.233*	8.161	66.596	181.306	43.560
UAE	Price-XO	0.567	0.540	0.753	–19.442	1.963	8.648	0.429	16	–2.248	4.574	20.924	1375.977	1052.157
UAE	Price-TE	0.658	0.636	0.811	–21.61	2.676	9.724	0.483	16	–2.222	5.545	30.743	2556.229	1330.39
Venezuela	Price-XC	0.841	0.831	0.917	–8.371	0.975	2.133	0.106	16	–3.924	9.206	84.747	339.087	64.019
Venezuela	Price-XO	0.007	–0.055	0.086	6.846	0.049	2.874	0.143	16	2.382	*0.346*	*0.120*	0.872	116.171
Venezuela	Price-TE	0.661	0.640	0.813	–1.525	1.024	3.691	0.183	16	*–0.413*	5.590	31.253	374.341	191.644
Yemen	Price-XC	0.510	0.469	0.714	–1.740	0.173	1.018	0.049	12	*–1.709*	3.535	12.499	9.598	9.215
Yemen	Price-XO	0.288	0.229	0.537	–0.115	0.018	0.170	0.008	12	*–0.674*	2.204	4.858	0.104	0.257
Yemen	Price-TE	0.483	0.451	0.695	–2.583	0.213	1.110	0.055	16	–2.327	3.870	14.976	16.214	17.322



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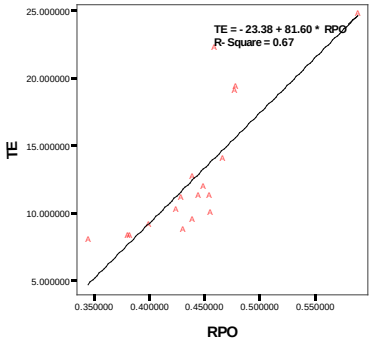

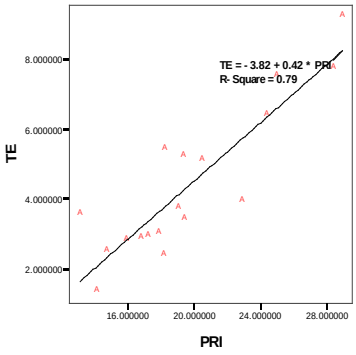

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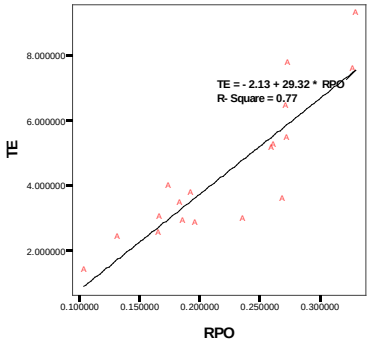

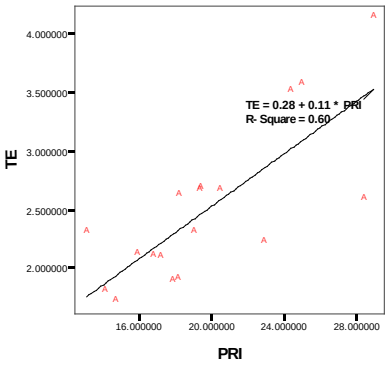

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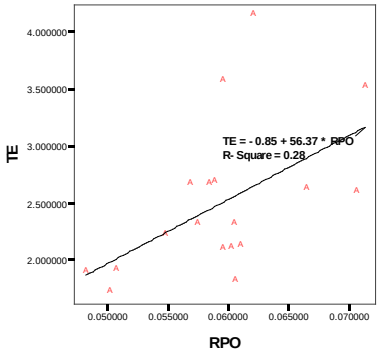

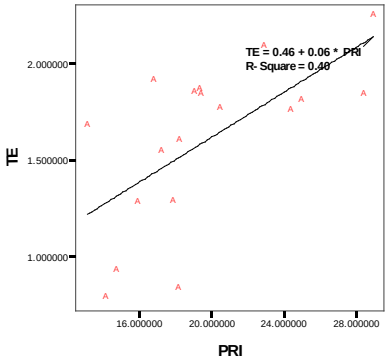

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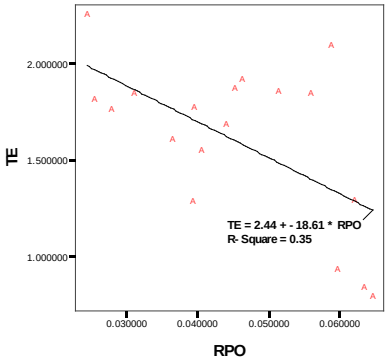

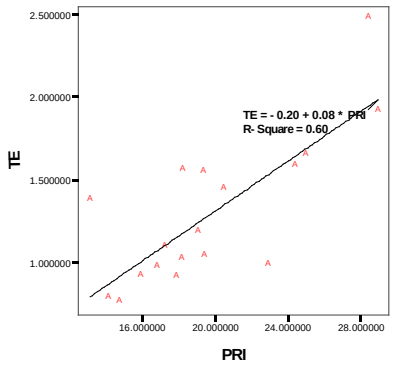

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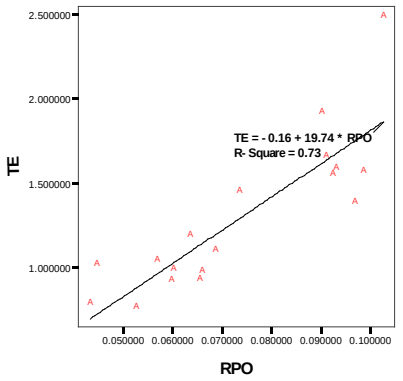

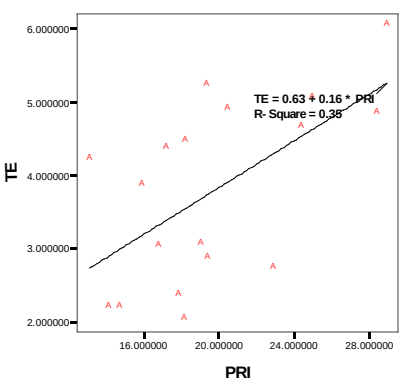

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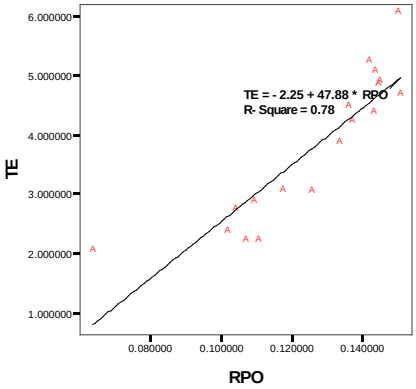

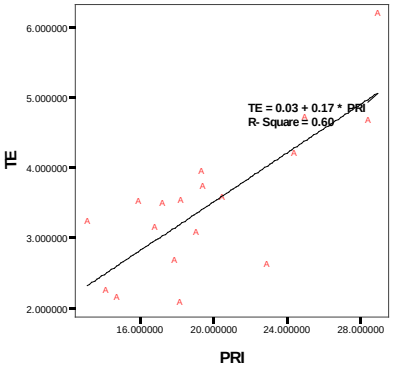

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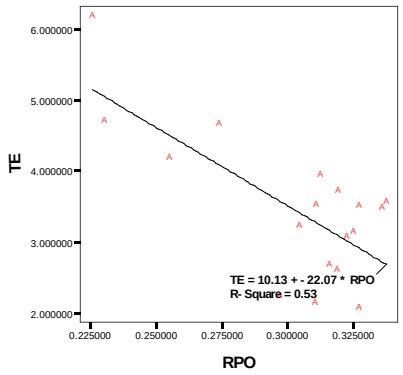

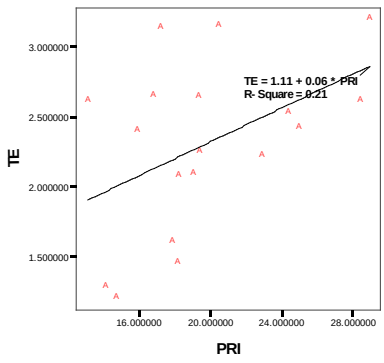

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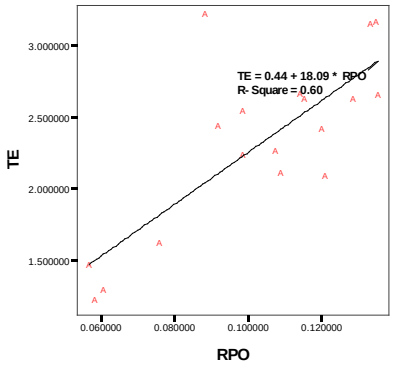

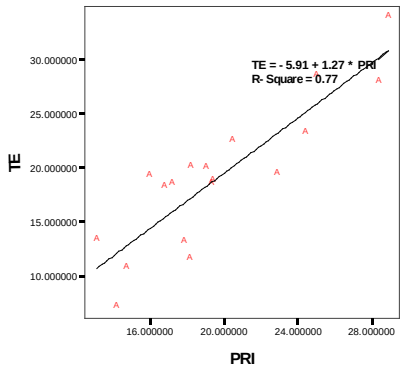

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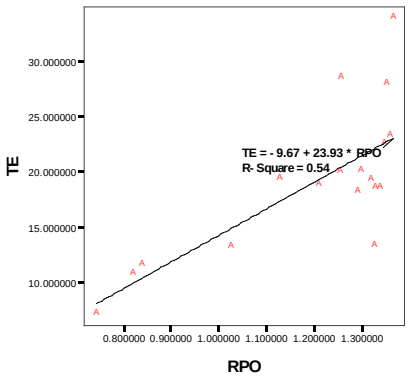

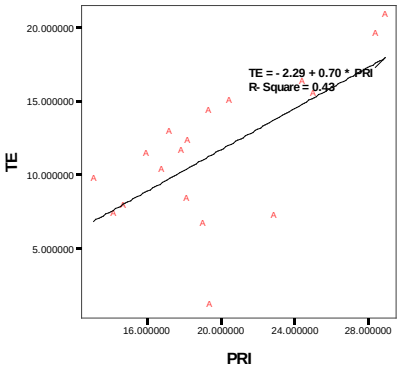

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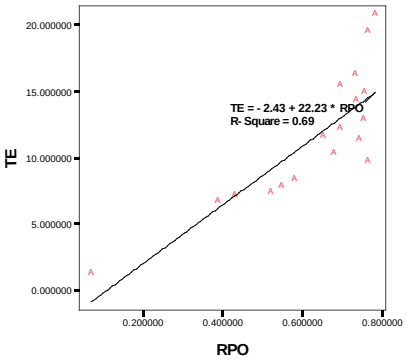

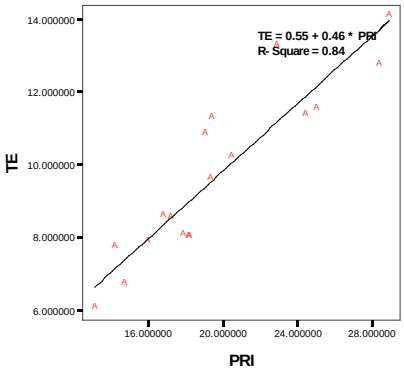

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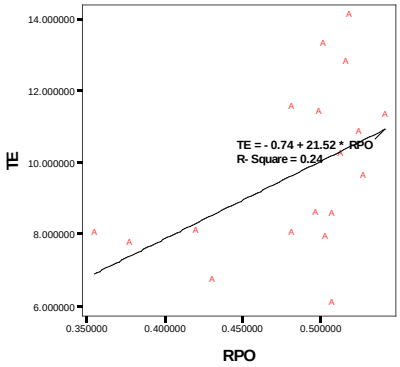

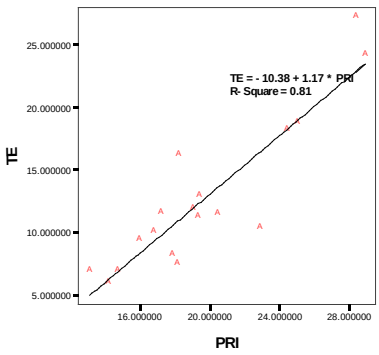

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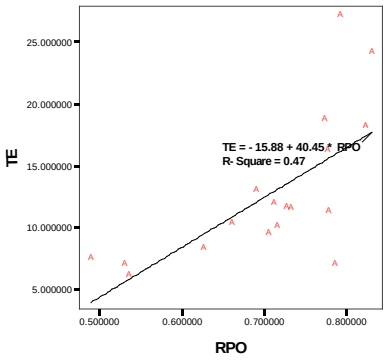
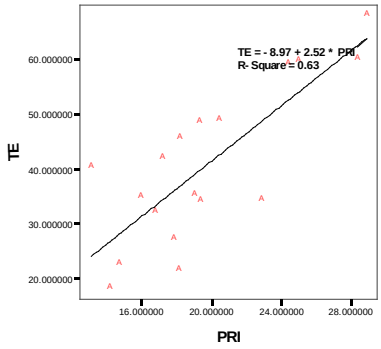
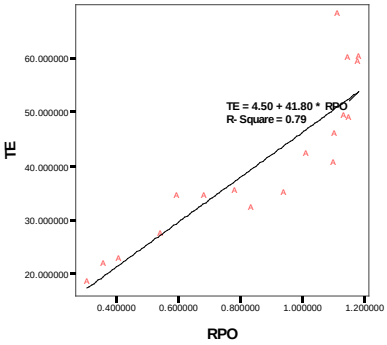
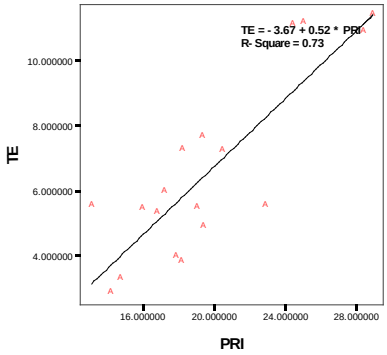




Norway





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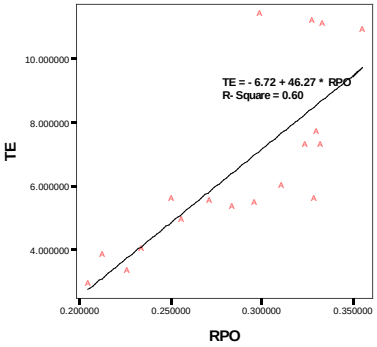
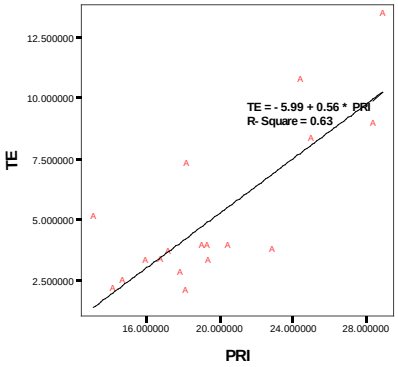
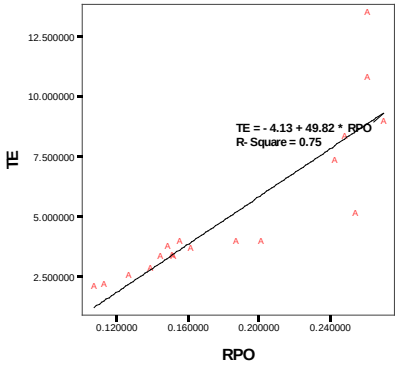
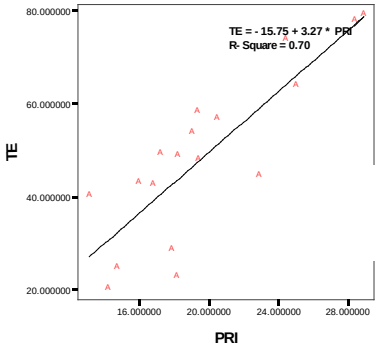


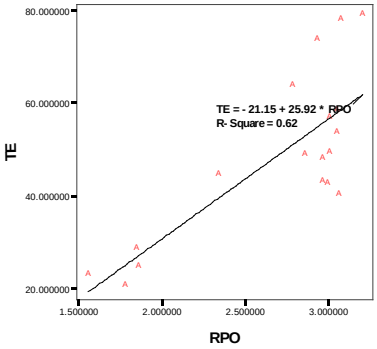


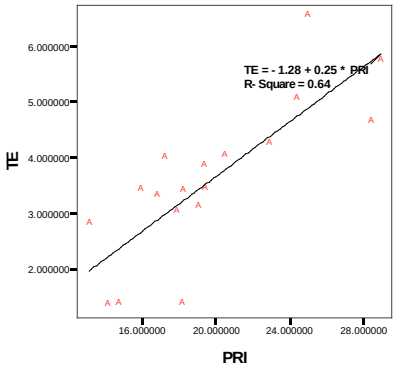
Qatar



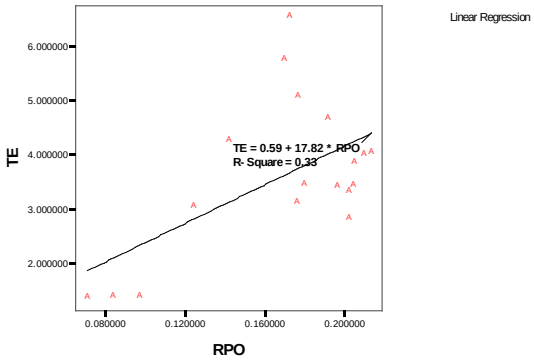


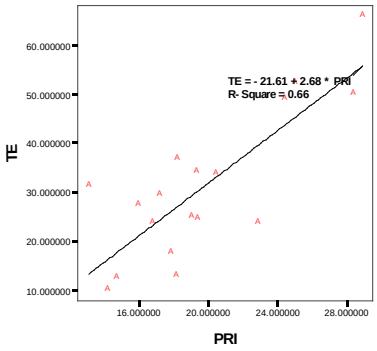
Saudi Arabia



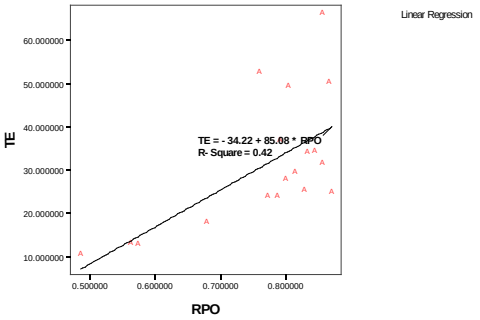


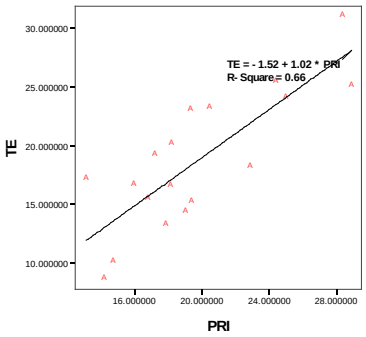
Syria



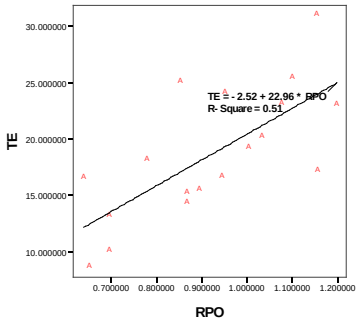


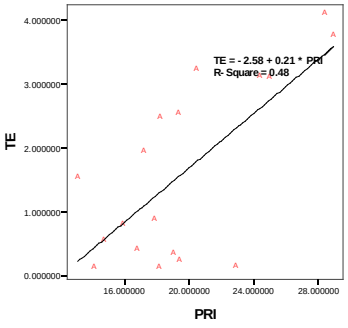
UAE



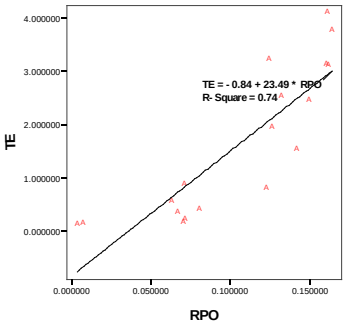


Venezuela





Yemen



Appendix7	Crude Oil Production (thousand barrels per day)																			
	Algeria	Angola	Brunei	Cameroon	Congo	Ecuador	Egypt	Gabon	Iran	Kuwait	Libya	Nigeria	Norway	Oman	Qatar	S.Arabia	Syria	UAE	Venezuela	Yemen
1986	945.0	282.0	166.0	177.0	119.0	293.0	813.0	166.0	2,035.0	1,419.0	1,034.0	1,467.0	841.5	560.0	308.0	4,870.0	194.0	1,330.0	1,787.0	10.0
1987	1,048.0	360.0	139.0	174.0	123.0	174.0	896.0	155.0	2,298.0	1,585.0	972.0	1,341.0	982.5	582.0	293.0	4,265.0	230.0	1,541.0	1,752.0	20.0
1988	1,040.0	452.0	137.0	163.0	144.0	302.0	848.0	159.0	2,240.0	1,492.0	1,175.0	1,450.0	1,113.1	617.0	346.0	5,086.0	265.0	1,565.0	1,903.0	173.0
1989	1,095.0	455.0	132.0	170.0	164.0	279.0	865.0	208.0	2,810.0	1,783.0	1,150.0	1,716.0	1,482.6	641.0	380.0	5,064.0	340.0	1,860.0	1,907.0	194.0
1990	1,175.0	475.0	150.0	161.0	165.0	285.0	873.0	270.0	3,088.0	1,175.0	1,375.0	1,810.0	1,630.0	685.0	406.0	6,410.0	388.0	2,117.0	2,137.0	193.0
1991	1,230.0	500.0	161.2	153.3	156.0	299.0	874.0	294.0	3,312.0	190.0	1,483.2	1,891.8	1,870.9	700.0	395.0	8,115.0	492.0	2,386.0	2,375.0	196.6
1992	1,214.0	526.3	165.3	140.4	174.0	321.0	881.2	297.7	3,429.1	1,058.1	1,432.7	1,943.0	2,131.9	740.0	423.2	8,331.7	480.9	2,266.0	2,371.0	182.1
1993	1,162.3	509.0	165.0	126.9	181.0	343.7	890.0	312.5	3,540.0	1,852.4	1,361.0	1,960.0	2,281.5	775.8	413.0	8,197.8	554.0	2,159.0	2,450.0	220.0
1994	1,180.0	536.0	167.2	107.9	180.0	365.0	895.7	328.5	3,618.0	2,025.0	1,377.6	1,930.9	2,569.6	810.0	415.0	8,120.0	560.0	2,193.0	2,588.0	335.0
1995	1,201.8	646.0	163.0	111.0	188.0	392.0	920.0	365.0	3,643.2	2,057.4	1,390.0	1,992.8	2,765.8	851.3	442.0	8,231.2	575.0	2,233.0	2,750.1	345.0
1996	1,242.1	708.8	155.4	108.0	201.0	395.8	921.7	368.4	3,685.7	2,061.7	1,400.8	2,000.5	3,091.0	883.4	510.5	8,218.1	582.3	2,277.7	2,938.0	340.4
1997	1,276.7	714.0	160.0	124.0	253.0	388.2	856.4	370.4	3,664.2	2,007.1	1,445.9	2,132.5	3,141.7	904.0	550.0	8,362.0	561.2	2,316.4	3,280.0	362.4
1998	1,246.4	735.1	157.4	120.5	265.0	375.5	833.6	352.0	3,633.8	2,085.3	1,390.0	2,153.5	3,011.2	899.8	695.6	8,388.9	553.4	2,345.3	3,167.0	387.8
1999	1,202.3	745.0	182.0	100.0	270.0	372.6	851.6	331.0	3,557.0	1,897.7	1,319.0	2,129.9	3,018.9	910.0	665.0	7,833.4	538.0	2,169.0	2,825.8	409.0
2000	1,253.9	746.4	193.0	84.8	280.0	394.9	748.0	315.0	3,696.3	2,078.5	1,410.0	2,165.0	3,221.5	970.0	737.2	8,403.8	522.8	2,367.8	3,155.0	440.0
2001	1,310.0	742.4	195.2	76.6	255.0	412.2	698.4	270.0	3,723.7	1,997.5	1,366.5	2,256.2	3,226.3	913.0	714.2	8,031.1	483.9	2,205.0	3,010.0	438.5
2002	1,306.0	896.4	163.0	69.8	249.2	392.5	631.4	251.2	3,444.3	1,894.2	1,318.5	2,117.9	3,130.6	896.7	679.1	7,634.4	472.2	2,082.0	2,603.9	443.3
2003	1,611.0	902.5	169.9	67.0	246.8	411.0	618.2	241.4	3,742.8	2,136.0	1,420.5	2,275.0	3,042.1	819.0	715.0	8,775.0	464.0	2,348.1	2,335.2	448.3

Source: http://www.eia.doe.gov/emeu/international/ 27/07/2006

	Area 4-A(i)	Area 4-A(i) Data	Area 4-A(ii)	Area 4-A(ii) Data	Area 4-A(iii)	Area 4-A(iii) Data	Area 4-A	Area 4-B(i)	Area 4-B(ii)	Area 4B	Area 4-C	Area 4-D	Area 4-E(i)	Area 4-E(ii)	Area 4-E	AREA 4 b
Year 1980 Countries	4Ai International trade tax revenues (% of trade sector)		4Aii Mean tariff rate		4Aiii Standard deviation of tariff rates		4A Tarrifs	4Bi Hidden import barriers	4Bii Costs of importing	4B Regulatory Trade Barriers	4C Actual vs. expected size of trade sector	4D Difference between official and black mkt exchange rates	4Ei Access of Citizens to foreign captial markets/foreign access to domestic capital markets (GCR)	4Eii Restrictions in Foreign Capital Market Exchange/Index of capital controls among 13 IMF categories	4E International Capital Market Controls	4 Freedom to Trade Internationally
Algeria			7.7	11.7			7.7				7.4	0.0		0.0	0.0	4.7
Cameroon	2.7	11.0					2.7				6.0	9.6		0.0	0.0	5.3
Congo, Rep. Of	7.5	3.8					7.5				10.0	9.6		0.0	0.0	7.0
Ecuador	5.2	7.2					5.2				5.2	7.4		2.0	2.0	5.6
Egypt	1.3	13.1	0.5	47.4			0.9				9.8	8.2		0.0	0.0	5.4
Gabon	5.1	7.3	1.3	43.3			3.2				6.9	9.6		0.0	0.0	5.6
Iran	0.0	17.0	5.9	20.7			2.9				4.0	0.0		0.0	0.0	3.0
Kuwait											6.5	10.0		2.0	2.0	
Nigeria	4.3	8.5	3.5	32.6			3.9				7.6	0.0		0.0	0.0	3.9
Norway	9.8	0.3	8.8	6.2			9.3				5.8	9.4		2.0	2.0	6.9
Oman											7.1	10.0		2.0	2.0	
Syria	5.3	7.1	2.5	37.3			3.9				4.8	3.0		0.0	0.0	4.0
Unit. Arab Em.	10.0	0.0					10.0				7.5	10.0		10.0	10.0	9.1
Venezuela	8.0	3.0					8.0				6.3	10.0		8.0	8.0	8.1

	Area 4-A(i)	Area 4-A(i) Data	Area 4-A(ii)	Area 4-A(ii) Data	Area 4-A(iii)	Area 4-A(iii) Data	Area 4-A	Area 4-B(i)	Area 4-B(ii)	Area 4B	Area 4-C	Area 4-D	Area 4-E(i)	Area 4-E(ii)	Area 4-E	AREA 4 b
Year 1985 Countries	4Ai International trade tax revenues (% of trade sector)		4Aii Mean tariff rate		4Aiii Standard deviation of tariff rates		4A Tarrifs	4Bi Hidden import barriers	4Bii Costs of importing	4B Regulatory Trade Barriers	4C Actual vs. expected size of trade sector	4D Difference between official and black mkt exchange rates	4Ei Access of Citizens to foreign captial markets/foreign access to domestic capital markets (GCR)	4Eii Restrictions in Foreign Capital Market Exchange/Index of capital controls among 13 IMF categories	4E International Capital Market Controls	4 Freedom to Trade Internationally
Algeria			5.7	21.7			5.7				5.6	0.0		0.0	0.0	3.9
Cameroon	5.9	6.1					5.9				6.3	9.8		0.0	0.0	6.1
Congo, Rep. Of			3.6	32.0			3.6				8.9	9.8		0.0	0.0	6.1
Ecuador	5.9	6.2	2.5	37.7			4.2				4.6	0.4		2.0	2.0	3.9
Egypt	1.9	12.1	1.4	42.8			1.7				6.5	0.0		0.0	0.0	3.3
Gabon	5.7	6.4	4.1	29.6			4.9				8.2	9.8		0.0	0.0	6.2
Iran	0.5	14.2	5.9	20.7			3.2				0.0	0.0		0.0	0.0	2.3
Kuwait			9.2	4.0			9.2				5.3	10.0		2.0	2.0	6.9
Malaysia	6.2	5.7	7.3	13.6			6.7				10.0	10.0		5.0	5.0	8.0
Mexico	8.3	2.6	4.0	30.0			6.1				3.6	5.0		2.0	2.0	5.0
Nigeria	6.6	5.1	2.6	37.0			4.6				4.1	0.0		0.0	0.0	3.4
Norway	9.8	0.3	8.9	5.7			9.3				5.3	10.0		5.0	5.0	7.6
Oman	9.1	1.4	9.4	3.0			9.2				5.9	10.0		2.0	2.0	7.1
Syria	6.3	5.6	4.6	27.0			5.4				2.1	0.0		0.0	0.0	3.2
Unit. Arab Em.	10.0	0.0	9.2	4.0			9.6				5.8	10.0		5.0	5.0	7.7
Venezuela	3.9	9.1	3.4	32.9			3.7				4.8	5.0		5.0	5.0	5.3

	Area 4-A(i)	Area 4-A(i) Data	Area 4-A(ii)	Area 4-A(ii) Data	Area 4-A(iii)	Area 4-A(iii) Data	Area 4-A	Area 4-B(i)	Area 4-B(ii)	Area 4B	Area 4-C	Area 4-D	Area 4-E(i)	Area 4-E(ii)	Area 4-E	AREA 4 b
Year 1990 Countries	4Ai International trade tax revenues (% of trade sector)		4Aii Mean tariff rate		4Aiii Standard deviation of tariff rates		4A Tarrifs	4Bi Hidden import barriers	4Bii Costs of importing	4B Regulatory Trade Barriers	4C Actual vs. expected size of trade sector	4D Difference between official and black mkt exchange rates	4Ei Access of Citizens to foreign captial markets/foreign access to domestic capital markets (GCR)	4Eii Restrictions in Foreign Capital Market Exchange/Index of capital controls among 13 IMF categories	4E International Capital Market Controls	4 Freedom to Trade Internationally
Algeria			5.1	24.6			5.1				5.1	0.0		0.0	0.0	3.7
Cameroon	6.4	5.4					6.4				3.1	9.2		0.0	0.0	5.4
Congo, Rep. Of	4.5	8.2					4.5				7.2	9.2		0.0	0.0	5.8
Ecuador	7.3	4.0	2.6	37.1	0.0	27.0	3.3				5.6	10.0		2.0	2.0	5.8
Egypt	6.1	5.9	3.3	33.5	0.0	425.8	3.1				6.3	0.0		0.0	0.0	3.5
Gabon	6.8	4.8					6.8				4.9	9.2		0.0	0.0	5.8
Iran	6.4	5.4	5.9	20.7			6.1				5.7	0.0		0.0	0.0	4.0
Kuwait	9.2	1.2					9.2				5.4	10.0		2.0	2.0	7.0
Malaysia	7.9	3.2	7.4	13.0	5.0	12.5	6.8				10.0	10.0		5.0	5.0	8.0
Mexico	8.7	2.0	7.8	11.1	7.2	7.0	7.9				5.5	10.0		5.0	5.0	7.3
Nigeria	7.3	4.0	3.1	34.3	0.0	30.8	3.5				10.0	5.4		0.0	0.0	5.4
Norway	9.8	0.3	8.9	5.7	7.2	6.9	8.6				4.7	10.0		8.0	8.0	7.9
Oman	9.3	1.0					9.3				5.3	10.0		2.0	2.0	7.0
Syria	8.1	2.9	5.9	20.4	0.0	27.7	4.7				4.4	0.0		0.0	0.0	3.5
Unit. Arab Em.	10.0	0.0					10.0				6.5	10.0		5.0	5.0	7.9
Venezuela	8.5	2.2	3.9	30.6	0.2	24.4	4.2				6.7	10.0		5.0	5.0	6.8

	Area 4-A(i)	Area 4-A(i) Data	Area 4-A(ii)	Area 4-A(ii) Data	Area 4-A(iii)	Area 4-A(iii) Data	Area 4-A	Area 4-B(i)	Area 4-B(ii)	Area 4B	Area 4-C	Area 4-D	Area 4-E(i)	Area 4-E(ii)	Area 4-E	AREA 4 b
Year 1995 Countries	4Ai International trade tax revenues (% of trade sector)		4Aii Mean tariff rate		4Aiii Standard deviation of tariff rates		4A Tarrifs	4Bi Hidden import barriers	4Bii Costs of importing	4B Regulatory Trade Barriers	4C Actual vs. expected size of trade sector	4D Difference between official and black mkt exchange rates	4Ei Access of Citizens to foreign captial markets/foreign access to domestic capital markets (GCR)	4Eii Restrictions in Foreign Capital Market Exchange/Index of capital controls among 13 IMF categories	4E International Capital Market Controls	4 Freedom to Trade Internationally
Algeria	3.6	9.6	5.4	22.9	2.2	19.6	3.7				5.9	0.0		2.0	2.0	4.0
Cameroon	4.9	7.7	6.3	18.7	0.0	29.6	3.7				4.1	9.8		0.0	0.0	5.2
Congo, Rep. Of	7.6	3.6	6.3	18.6	6.2	9.5	6.7				9.1	9.8		0.0	0.0	6.8
Ecuador	7.7	3.5	7.5	12.3	7.8	5.6	7.7				5.1	7.6		5.0	5.0	6.7
Egypt	4.8	7.8	4.3	28.3	0.0	28.9	3.1	4.5		4.5	5.7	9.4	9.2	5.0	7.1	5.9
Gabon	5.8	6.3					5.8				5.5	9.8		0.0	0.0	5.9
Iran	8.7	1.9	5.9	20.7			7.3				4.6	0.0		0.0	0.0	4.0
Kuwait	9.4	0.9					9.4				4.4	10.0		2.0	2.0	6.8
Malaysia	8.9	1.6	7.4	12.8	4.4	14.0	6.9	6.7		6.7	10.0	10.0	7.3	5.0	6.2	8.0
Mexico	9.3	1.1	7.5	12.6	7.8	5.4	8.2	6.3		6.3	7.9	10.0	7.8	5.0	6.4	7.8
Nigeria			5.6	21.8	3.7	15.7	4.7				10.0	0.0		0.0	0.0	4.6
Norway	9.7	0.4	8.8	5.9	5.7	10.7	8.1	9.2		9.2	4.1	10.0	9.3	8.0	8.6	8.0
Oman	9.3	1.1	8.9	5.7	6.3	9.2	8.1				5.5	10.0		2.0	2.0	6.8
Syria	7.1	4.3	7.0	14.8			7.1				5.3	0.0		0.0	0.0	4.1
Unit. Arab Em.											7.4	10.0		5.0	5.0	
Venezuela	7.9	3.1	7.3	13.4	8.1	4.8	7.8	4.6		4.6	5.2	1.6	8.7	5.0	6.9	5.2

	Area 4-A(i)	Area 4-A(i) Data	Area 4-A(ii)	Area 4-A(ii) Data	Area 4-A(iii)	Area 4-A(iii) Data	Area 4-A	Area 4-B(i)	Area 4-B(ii)	Area 4B	Area 4-C	Area 4-D	Area 4-E(i)	Area 4-E(ii)	Area 4-E	AREA 4 b
Year 2000 Countries	4Ai International trade tax revenues (% of trade sector)		4Aii Mean tariff rate		4Aiii Standard deviation of tariff rates		4A Tarrifs	4Bi Hidden import barriers	4Bii Costs of importing	4B Regulatory Trade Barriers	4C Actual vs. expected size of trade sector	4D Difference between official and black mkt exchange rates	4Ei Access of Citizens to foreign captial markets/foreign access to domestic capital markets (GCR)	4Eii Restrictions in Foreign Capital Market Exchange/Index of capital controls among 13 IMF categories	4E International Capital Market Controls	4 Freedom to Trade Internationally
Algeria	6.4	5.5	5.1	24.6	3.4	16.5	4.9				6.3	7.8		1.7	1.7	5.8
Cameroon	3.8	9.2	6.3	18.4			5.1				5.1	10.0		0.8	0.8	5.8
Congo, Rep. Of	9.2	1.1	6.5	17.6	6.6	8.6	7.4				8.5	10.0		0.0	0.0	6.8
Ecuador	6.5	5.2	7.4	12.9	7.5	6.3	7.1	3.1	6.3	4.7	6.2	10.0	9.2	6.2	7.7	7.2
Egypt	5.3	7.0	5.9	20.5	0.0	39.5	3.7	4.5	6.7	5.6	4.1	10.0	9.2	5.4	7.3	6.1
Gabon			5.9	20.4	6.1	9.8	6.0				4.0	10.0		0.0	0.0	5.6
Iran	8.0	3.1	9.0	4.9	8.3	4.2	8.4				4.3	8.9		0.0	0.0	6.0
Kuwait	9.3	1.1					9.3				4.1	10.0		4.6	4.6	7.2
Malaysia	9.0	1.6	8.2	9.2	0.0	33.3	5.7	6.7	9.2	7.9	10.0	10.0	6.6	0.8	3.7	7.5
Mexico	9.3	1.0	6.8	16.2	6.3	9.2	7.5	6.4	8.2	7.3	8.2	10.0	8.7	1.5	5.1	7.6
Nigeria					3.8	15.6	3.8	3.2		3.2	10.0	5.7	8.7	5.4	7.0	5.9
Norway	9.8	0.3	9.4	2.9	3.4	16.6	7.5	7.8	8.8	8.3	4.3	10.0	8.8	6.9	7.8	7.6
Oman	9.4	0.9	9.1	4.7	9.5	1.2	9.3				5.2	10.0		6.7	6.7	7.9
Syria	7.6	3.7					7.6				5.0	10.0		0.0	0.0	6.2
Unit. Arab Em.	10.0	0.0	9.2	4.0			9.6				6.9	10.0		6.2	6.2	8.2
Venezuela	7.9	3.1	7.3	13.5	7.6	5.9	7.6	4.9	6.5	5.7	4.5	10.0	9.4	6.9	8.1	7.2

	Area 4-A(i)	Area 4-A(i) Data	Area 4-A(ii)	Area 4-A(ii) Data	Area 4-A(iii)	Area 4-A(iii) Data	Area 4-A	Area 4-B(i)	Area 4-B(ii)	Area 4B	Area 4-C	Area 4-D	Area 4-E(i)	Area 4-E(ii)	Area 4-E	AREA 4 b
Year 2001 Countries	4Ai International trade tax revenues *(% of trade sector)*		4Aii Mean tariff rate		4Aiii Standard deviation of tariff rates		4A Tarrifs	4Bi Hidden import barriers	4Bii Costs of importing	4B Regulatory Trade Barriers	4C Actual vs. expected size of trade sector	4D Difference between official and black mkt exchange rates	4Ei Access of Citizens to foreign captial markets/foreign access to domestic capital markets (GCR)	4Eii Restrictions in Foreign Capital Market Exchange/Index of capital controls among 13 IMF categories	4E International Capital Market Controls	4 Freedom to Trade Internationally
Algeria	5.6	6.7	5.5	22.4	4.3	14.3	5.1				5.7	7.0		1.7	1.7	5.5
Cameroon	3.8	9.2	6.4	18.0	6.2	9.6	5.5				5.3	10.0		0.8	0.8	6.0
Congo, Rep. Of	8.9	1.7	6.3	18.6	6.2	9.6	7.1				9.1	10.0		0.0	0.0	6.9
Ecuador	6.5	5.2	7.4	12.9	7.5	6.3	7.1	3.4	6.3	4.8	5.5	10.0	9.2	6.2	7.7	7.0
Egypt	5.7	6.4	5.9	20.5	0.0	39.5	3.9	4.5	6.7	5.6	4.2	10.0	9.2	5.4	7.3	6.2
Gabon			6.2	18.8	6.1	9.7	6.2				5.8	10.0		0.0	0.0	6.0
Iran	8.0	3.1	9.0	4.9	8.3	4.2	8.4				5.6	9.6		0.0	0.0	6.4
Kuwait	9.3	1.1					9.3				4.1	10.0		4.6	4.6	7.2
Nigeria			6.0	20.0	3.8	15.6	4.9	3.4	7.1	5.3	10.0	5.7	8.7	5.4	7.0	6.6
Norway	9.9	0.2	9.3	3.3	4.4	14.0	7.9	7.2	8.7	7.9	4.0	10.0	8.8	6.9	7.8	7.5
Oman	9.4	0.8	9.1	4.7	9.5	1.2	9.3				5.3	10.0		6.7	6.7	7.9
Syria	7.6	3.7					7.6				5.0	10.0		0.0	0.0	6.2
Unit. Arab Em.	10.0	0.0	9.2	4.0			9.6				6.9	10.0		6.2	6.2	8.2
Venezuela	7.5	3.7	7.3	13.5	7.6	5.9	7.5	4.6	7.4	6.0	3.8	10.0	9.4	6.2	7.8	7.0

	Area 4-A(i)	Area 4-A(i) Data	Area 4-A(ii)	Area 4-A(ii) Data	Area 4-A(iii)	Area 4-A(iii) Data	Area 4-A	Area 4-B(i)	Area 4-B(ii)	Area 4B	Area 4-C	Area 4-D	Area 4-E(i)	Area 4-E(ii)	Area 4-E	AREA 4 b
Year 2002 Countries	4Ai International trade tax revenues *(% of trade sector)*		4Aii Mean tariff rate		4Aiii Standard deviation of tariff rates		4A Tarrifs	4Bi Hidden import barriers	4Bii Costs of importin g	4B Regulatory Trade Barriers	4C Actual vs. expected size of trade sector	4D Difference between official and black mkt exchange rates	4Ei Access of Citizens to foreign captial markets/foreign access to domestic capital markets/Foreign ownership restrictions (GCR)	4Eii Restrictions in Foreign Capital Market Exchange/Index of capital controls among 13 IMF categories	4E International Capital Market Controls	4 Freedom to Trade Internationally
Algeria	4.9	7.6	6.2	18.8	4.3	14.3	5.2	4.5	6.8	5.6	5.9	8.1	5.8	0.8	3.3	5.6
Cameroon	3.8	9.2	6.3	18.3	6.2	9.6	5.4	3.3	4.8	4.0	4.7	10.0	8.4	0.8	4.6	5.8
Congo, Rep. Of	9.0	1.6	6.1	19.6	6.2	9.6	7.1				8.7	10.0		0.0	0.0	6.8
Ecuador	6.5	5.2	7.5	12.5	7.5	6.3	7.2	4.0	7.0	5.5	4.5	10.0	6.0	6.2	6.1	6.7
Egypt	6.0	6.0	6.2	19.1	0.0	39.5	4.1	4.5	6.5	5.5	3.9	5.2	7.4	5.4	6.4	5.0
Gabon			6.0	20.2	6.1	9.7	6.0				5.6	10.0		0.0	0.0	6.0
Iran	7.6	3.6	9.0	4.9	8.3	4.2	8.3				6.7	7.4		0.0	0.0	6.1
Kuwait	9.3	1.1	9.3	3.5			9.3				3.7	10.0		4.6	4.6	7.1
Nigeria			4.7	26.7	3.8	15.6	4.2	3.2	5.9	4.5	10.0	8.6	9.2	5.4	7.3	6.9
Norway	9.9	0.2	9.8	0.8	4.4	14.0	8.0	6.2	8.1	7.1	3.5	10.0	7.6	5.4	6.5	7.0
Oman	9.4	0.8	8.4	8.0	9.5	1.2	9.1				5.2	10.0		6.7	6.7	7.8
Syria	7.6	3.7	7.1	14.7			7.3				4.7	5.3		0.0	0.0	5.1
Unit. Arab Em.	10.0	0.0	9.2	4.0			9.6				6.9	10.0		6.2	6.2	8.2
Venezuela	8.2	2.7	7.3	13.5	7.6	5.9	7.7	3.0	7.0	5.0	4.5	0.0	7.2	3.1	5.1	4.5

	Area 4-A(i)	Area 4-A(i) Data	Area 4-A(ii)	Area 4-A(ii) Data	Area 4-A(iii)	Area 4-A(iii) Data	Area 4-A	Area 4-B(i)	Area 4-B(ii)	Area 4B	Area 4-C	Area 4-D	Area 4-E(i)	Area 4-E(ii)	Area 4-E	AREA 4 b
Year 2003 Countries	4Ai International trade tax revenues *(% of trade sector)*		4Aii Mean tariff rate		4Aiii Standard deviation of tariff rates		4A Tarrifs	4Bi Hidden import barriers	4Bii Costs of importing	4B Regulatory Trade Barriers	4C Actual vs. expected size of trade sector	4D Difference between official and black mkt exchange rates	4Ei Foreign ownership restrictions (GCR)	4Eii Restrictions in Foreign Capital Market Exchange/Index of capital controls among 13 IMF categories	4E International Capital Market Controls	4 Freedom to Trade Internationally
Algeria	4.9	7.6	6.3	18.4	4.3	14.3	5.2	4.7	7.0	5.8	6.0	8.1	5.4	0.8	3.1	5.6
Cameroon	3.8	9.2	6.3	18.3	6.2	9.6	5.4	3.3	3.0	3.2	4.3	10.0	8.4	0.8	4.6	5.5
Congo, Rep. Of	9.0	1.6	6.1	19.6	6.2	9.6	7.1				8.8	10.0		0.0	0.0	6.7
Ecuador	6.5	5.2	7.5	12.5	7.5	6.3	7.2	3.7	7.2	5.4	4.2	10.0	5.4	7.7	6.5	6.7
Egypt	6.0	6.0	6.2	19.1	0.0	39.5	4.1	3.7	7.0	5.3	4.7	5.2	7.0	5.4	6.2	5.1
Gabon			6.0	20.2	6.1	9.7	6.0				5.8	10.0		0.0	0.0	5.8
Iran	6.3	5.5	9.0	4.9	8.3	4.2	7.9				5.4	7.4		0.0	0.0	5.6
Kuwait	9.3	1.1	9.3	3.5			9.3				2.7	10.0		4.6	4.6	6.9
Nigeria			4.7	26.7	3.8	15.6	4.2	4.2	5.7	4.9	10.0	8.6	8.2	5.4	6.8	6.9
Norway	9.9	0.2	9.9	0.5	4.4	14.0	8.1	8.0	9.2	8.6	3.4	10.0	8.2	6.2	7.2	7.4
Oman	9.4	0.8	8.4	8.0	9.5	1.2	9.1				5.3	10.0		6.7	6.7	7.9
Syria	7.6	3.7	7.1	14.7			7.3				5.3	5.3		0.0	0.0	4.9
Unit. Arab Em.	10.0	0.0	9.2	4.0			9.6	8.3	9.8	9.1	6.9	10.0	5.8	6.2	6.0	8.3
Venezuela	8.2	2.7	7.3	13.5	7.6	5.9	7.7	2.5	6.7	4.6	4.4	0.0	6.8	5.4	6.1	4.6

4: Freedom to Trade Internationally

A. Taxes on international trade.

i. Revenue from taxes on international trade as a percentage of exports plus imports.

ii. Mean tariff rate.

iii. Standard deviation of tariff rates.

B. Regulatory trade barriers.

i. Hidden import barriers: No barriers other than published tariffs and quotas.

ii. Costs of importing: the combined effect of import tariffs, licence fees, bank fees, and the time required for administrative red-tape raises costs of importing equipment by (10 = 10% or less; 0 = more than 50%).

C. Actual size of trade sector compared to expected size.

D. Difference between official exchange rate and black market rate.

E. International capital market controls

i. Access of citizens to foreign capital markets and foreign access to domestic capital markets.

ii. Restrictions on the freedom of citizens to engage in capital market exchange with foreigners—index of capital controls among 13 IMF categories.

Gwartney, James and Robert Lawson (2005). *Economic Freedom of the World: 2005 Annual Report.* Vancouver: The Fraser Institute. Data retrieved from www.freetheworld.com. 25/12/05

Note that from 1985 to 2000 the Economic Freedom of the World Index is available on a five year basis only.

Algeria																		
Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	3120.6	3724.2	3484.0	4179.0	5385.4	5060.0	4806.7	4448.7	3924.5	4309.8	5329.0	5646.5	4084.2	4975.1	9254.4	7132.9	7956.4	11346.3
XO	4710.1	4461.7	4670.6	4770.0	5625.7	6730.0	6330.1	5649.0	4669.3	5046.9	5770.2	8247.6	5754.4	7550.2	12776.9	12007.2	10874.8	13265.2
T E	7830.7	8185.9	8154.6	8949.0	11011.1	11790.0	11136.8	10097.7	8593.8	9356.7	11099.2	13894.1	9838.6	12525.3	22031.3	19140.1	18831.2	24611.5
CER	39.851	45.495	42.724	46.698	48.909	42.918	43.161	44.057	45.667	46.061	48.012	40.640	41.512	39.720	42.006	37.267	42.251	46.102
BASIC CALCULATIONS	∑XCi/n=38133.1/9 = 4237.01			∑XOi/n=47616.5/9 = 5290.72			∑TEi/n=85749.6/9 = 9527.73			∑XCi/n=60034.6/9 = 6670.51			∑XOi/n=81293.4/9 = 9032.60			∑TEi/n=141328.0/9 = 15703.11		

n=9					
	CER(t)	*$CER_{(1)}$ =44.4702988*		*$CER_{(2)}$ =42.47891023*	
	θ (m$)	+ 2433.50 (25.54%)			
	λ (m$)	+ 3741.88 (39.27%)			
	ΔTE (m$)	+ 6175.38 (*GTE* 64.81%)			
	ΔCER (%)	– 1.99138857 ≈ – 1.99			
		Point 1	CER effects	TE effects	**Point 2**
	np (m$)	5290.72	+ 312.71	+ 3429.17	9032.60
	p (m$)	4237.01	– 312.71	+ 2746.21	6670.51
	Total (m$)	9527.73	0	+ 6175.38	15703.11
	Piont4	P4=6983.22, np4=8719.89			
	ETO (m$)	+ 312.71	ETOV	+ 4.478	

Unit : Million US Dollars (m$) at current price
XC = Crude oil export, XO = Other sectors plus refined export,
T E = Total export (f.o.b), CER = Crude Export Ratio, (na) means not available,
Sources: UNCTAD Handbook of Statistics 2005 [online]. Available from: http://stats.unctad.org/Handbook/TableViewer/tableView.aspx (XC), http://stats.unctad.org/Handbook/TableViewer/tableView.aspx?ReportId=135 (TE)

Angola

Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	817.4	2153.1	2059.8	2384.0	3598.8	3120.9	3424.0	2602.2	2489.6	2567.0	4597.5	4604.7	2990.3	4530.7	6806.0	5585.8	6731.7	8694.0
XO	514.6	212.4	434.7	604.8	311.5	288.8	273.5	240.8	298.4	343.6	497.5	576.3	552.7	866.3	896.0	794.0	777.9	543.4
T E	1332.0	2365.5	2494.5	2988.8	3910.3	3409.7	3697.5	2843.0	2788.0	2910.6	5095.0	5181.0	3543.0	5397.0	7702.0	6379.8	7509.6	9237.4
CER	61.366	91.021	82.574	79.764	92.034	91.530	92.603	91.530	89.297	88.195	90.236	88.877	84.400	83.948	88.367	87.554	89.641	94.117
BASIC CALCULATIONS	∑XCi/n=22400.0/7 = 3200.00			∑XOi/n=2254.1/7 = 322.01			∑TEi/n=24654.1/7 = 3522.01			∑XCi/n=39943.2/7 = 5706.17			∑XOi/n=5006.6/7 = 715.23			∑TEi/n=44949.8/7 = 6421.40		

n=7					
	CER(t)	$CER_{(1)}$ =90.85720938		$CER_{(2)}$ =88.86177469	
	θ (m$)	+ 2506.17 (71.16%)			
	λ (m$)	+ 393.22 (11.16%)			
	ΔTE (m$)	+ 2899.39 (*GTE* 82.32%)			
	ΔCER (%)	– 1.995434688 ≈ – 2.00			
		Point 1	CER effects	TE effects	**Point 2**
	np (m$)	322.01	+ 128.13	+ 265.09	715.23
	p (m$)	3200.00	– 128.13	+ 2634.30	5706.17
	Total (m$)	3522.01	0	+ 2899.30	6421.40
	Piont4	P4=5834.30, np4=587.10			
	ETO (m$)	+ 128.13	ETOV	+ 2.196	

Unit : Million US Dollars (m$) at current price
XC = Crude oil export, XO = Other sectors plus refined export,
T E = Total export (f.o.b), CER = Crude Export Ratio, (na) means not available,
Sources: UNCTAD Handbook of Statistics 2005 [online]. Available from: http://stats.unctad.org/Handbook/TableViewer/tableView.aspx (XC), http://stats.unctad.org/Handbook/TableViewer/tableView.aspx?ReportId=135 (TE)

Brunei

Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	729.7	927.8	725.7	881.5	1126.2	1272.6	1249.2	1065.3	1052.0	1041.2	1102.7	1102.7	778.3	1160.5	1147.3	1556.5	1688.9	2022.1
XO	1068.3	974.2	981.9	1001.6	1087.1	1409.5	1052.0	1028.6	1058.3	1047.4	1554.4	1554.4	1528.5	1455.1	1438.7	1951.7	1876.8	2122.2
T E	1798.0	1902.0	1707.6	1883.1	2213.3	2682.1	2301.2	2093.9	2110.3	2088.6	2657.1	2657.1	2306.8	2615.6	2586.0	3508.2	3565.7	4144.3
CER	40.584	48.780	42.498	46.811	50.883	47.448	54.285	50.876	49.851	49.852	41.500	41.500	33.739	44.368	44.366	44.367	47.365	48.792
BASIC CALCULATIONS	∑XCi/n=9030.0/9 = 1003.33			∑XOi/n=9661.5/9 = 1073.50			∑TEi/n=18691.5/9 = 2076.83			∑XCi/n=11600.2/9 = 1288.91			∑XOi/n=14529.2/9 = 1614.36			∑TEi/n=26129.4/9 = 2903.27		

n=9					
	CER(t)	$CER_{(1)}$ =48.32297837		$CER_{(2)}$ =44.3951131	
	θ (m$)	+ 285.58 (13.75%)			
	λ (m$)	+ 540.86 (26.04%)			
	ΔTE (m$)	+ 826.44 (*GTE* 39.79%)			
	ΔCER (%)	– 3.92786527 ≈ – 3.93			
		Point 1	CER effects	TE effects	**Point 2**
	np (m$)	1073.50	+ 114.04	+ 426.82	1614.36
	p (m$)	1003.33	– 114.04	+ 399.62	1288.91
	Total (m$)	2076.83	0	+ 826.44	2903.27
	Piont4	p4=1402.95, np4=1500.32			
	ETO (m$)	+ 114.04	ETOV	+ 8.129	

Unit : Million US Dollars (m$) at current price
XC = Crude oil export, XO = Other sectors plus refined export,
T E = Total export (f.o.b), CER = Crude Export Ratio, (na) means not available,
Sources: UNCTAD Handbook of Statistics 2005 [online]. Available from: http://stats.unctad.org/Handbook/TableViewer/tableView.aspx (XC), http://stats.unctad.org/Handbook/TableViewer/tableView.aspx?ReportId=135 (TE)

Cameroon

Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	74.2	142.1	682.3	229.6	1034.8	912.1	915.1	550.2	368.9	445.3	628.0	611.1	804.4	765.8	880.1	809.5	824.6	999.3
XO	706.6	687.3	241.7	1052.0	1045.9	921.9	924.9	1350.8	905.7	1093.4	1129.9	1248.2	870.5	828.8	952.5	939.9	977.1	1246.5
T E	780.8	829.4	924.0	1281.6	2080.7	1834.0	1840.0	1901.0	1274.6	1538.7	1757.9	1859.3	1674.9	1594.6	1832.6	1749.4	1801.7	2245.8
CER	9.503	17.133	73.842	17.915	49.733	49.733	49.734	28.943	28.942	28.940	35.724	32.867	48.027	48.025	48.025	46.273	45.768	44.496

BASIC CALCULATIONS	∑XCi/n=5138.3/8 = 642.29	∑XOi/n=7536.3/8 = 942.04	∑TEi/n=12674.6/8 = 1584.33	∑XCi/n=6322.8/8 = 790.35	∑XOi/n=8193.4/8 = 1024.18	∑TEi/n=14516.2/8 = 1814.53

n=8					
	CER(t)	$CER_{(1)}$ =40.54016524		$CER_{(2)}$ =43.5567337	
	θ (m$)	+ 148.06 (%)			
	λ (m$)	+ 82.14 (%)			
	ΔTE (m$)	+ 230.20 (*GTE* %)			
	ΔCER (%)	+ 3.01656846 ≈ + 3.02			
		Point 1	CER effects	TE effects	**Point 2**
	np (m$)	942.04	– 54.74	+ 136.88	1024.18
	p (m$)	642.29	+ 54.74	+ 93.32	790.35
	Total (m$)	1584.33	0	+ 230.20	1814.53
	Piont4	P4=735.61, np4=1078.92			
	ETO (m$)	– 54.74	ETOV	– 5.074	

Unit : Million US Dollars (m$) at current price
XC = Crude oil export, XO = Other sectors plus refined export,
T E = Total export (f.o.b), CER = Crude Export Ratio, (na) means not available,
Sources: UNCTAD Handbook of Statistics 2005 [online]. Available from: http://stats.unctad.org/Handbook/TableViewer/tableView.aspx (XC), http://stats.unctad.org/Handbook/TableViewer/tableView.aspx?ReportId=135 (TE)

Congo																		
Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	657.7	736.8	571.9	712.3	796.1	952.6	1092.0	890.9	746.7	936.3	1235.5	1324.3	879.3	1018.3	1732.9	1138.2	1243.3	1389.8
XO	119.2	273.3	179.2	196.6	181.6	79.4	91.0	74.4	171.1	153.5	202.6	217.2	493.2	536.8	744.1	437.9	405.4	518.3
T E	776.9	1010.1	751.1	908.9	977.7	1032.0	1183.0	965.3	917.8	1089.8	1438.1	1541.5	1372.5	1555.1	2477.0	1576.1	1648.7	1908.1
CER	84.657	72.943	76.142	78.369	81.426	92.306	92.308	92.293	81.358	85.915	85.912	85.910	64.066	65.481	69.960	72.216	75.411	72.837
BASIC CALCULATIONS	∑XCi/n=6650.1/7 = 950.01			∑XOi/n=953.6/7 = 136.23			∑TEi/n=7603.7/7 = 1086.24			∑XCi/n=8726.1/7 = 1246.58			∑XOi/n=3352.9/7 = 478.99			∑TEi/n=12079.0/7 = 1725.57		

n=7					
CER(t)	$CER_{(1)}$ =87.45857269			$CER_{(2)}$ =72.2416361	
θ (m$)	+ 296.57 (27.30%)				
λ (m$)	+ 342.76 (31.56%)				
ΔTE (m$)	+ 639.33 (*GTE* 58.86%)				
ΔCER (%)	– 15.21693659 ≈ – 15.22				
	Point 1	CER effects	TE effects	**Point 2**	
np (m$)	136.23	+ 262.58	+ 80.18	478.99	
p (m$)	950.01	– 262.58	+ 559.15	1246.58	
Total (m$)	1086.24	0	+ 639.33	1725.57	
Piont4	P4=1509.16, np4=216.41				
ETO (m$)	+ 262.58	ETOV	+ 17.399		

Unit : Million US Dollars (m$) at current price
XC = Crude oil export, XO = Other sectors plus refined export,
T E = Total export (f.o.b), CER = Crude Export Ratio, (na) means not available,
Sources: UNCTAD Handbook of Statistics 2005 [online]. Available from: http://stats.unctad.org/Handbook/TableViewer/tableView.aspx (XC), http://stats.unctad.org/Handbook/TableViewer/tableView.aspx?ReportId=135 (TE)

Ecuador

Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	912.4	645.8	975.7	1032.7	1258.4	1059.0	1251.0	1149.0	1185.0	1395.5	1520.8	1404.3	789.0	1312.3	2144.0	1722.3	1838.5	2372.3
XO	1271.8	1374.9	1216.8	1321.2	1456.0	1792.4	1791.3	1871.0	2658.4	2966.0	3369.0	3809.8	3414.0	3138.8	2677.9	2925.2	3203.0	3666.2
T E	2184.2	2020.7	2192.5	2353.9	2714.4	2851.4	3042.3	3020.0	3843.4	4361.5	4889.8	5214.1	4203.0	4451.1	4821.9	4647.5	5041.5	6038.5
CER	43.361	31.959	44.502	43.872	46.360	37.140	41.120	38.046	30.832	31.996	31.101	26.933	18.772	29.483	44.464	37.059	36.467	39.286
BASIC CALCULATIONS	∑XCi/n=9306.3/8 = 1163.29			∑XOi/n=15073.1/8 = 1884.14			∑TEi/n=24379.4/8 = 3047.43			∑XCi/n=13103.5/8 = 1637.94			∑XOi/n=26203.9/8 = 3275.49			∑TEi/n=39307.4/8 = 4913.43		

n=8					
CER(t)	$CER_{(1)}$ =38.17282103			$CER_{(2)}$ =33.33597914	
θ (m$)	+ 474.65 (15.57%)				
λ (m$)	+ 1391.35 (45.66%)				
ΔTE (m$)	+ 1866.00 (*GTE* 61.23%)				
ΔCER (%)	– 4.83684189 ≈ – 4.84				
	Point 1	CER effects	TE effects	**Point 2**	
np (m$)	1884.14	+ 237.65	+ 1153.70	3275.49	
p (m$)	1163.29	– 237.65	+ 712.30	1637.94	
Total (m$)	3047.43	0	+ 1866.00	4913.43	
Piont4	P4=1875.59, np4=3037.84				
ETO (m$)	+ 237.65	ETOV	+ 12.671		

Unit : Million US Dollars (m$) at current price
XC = Crude oil export, XO = Other sectors plus refined export,
T E = Total export (f.o.b), CER = Crude Export Ratio, (na) means not available,
Sources: UNCTAD Handbook of Statistics 2005 [online]. Available from: http://stats.unctad.org/Handbook/TableViewer/tableView.aspx (XC), http://stats.unctad.org/Handbook/TableViewer/tableView.aspx?ReportId=135 (TE)

Egypt

Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	860.3	525.8	460.7	560.0	479.0	1697.9	1157.7	1314.6	793.0	719.2	816.6	668.2	162.0	293.0	616.8	297.6	316.7	340.9
XO	1354.0	1511.4	1659.7	2087.8	2103.0	1994.7	1892.3	1790.6	2679.5	2724.9	2717.9	3239.8	3033.3	3207.9	4022.6	3864.0	4374.9	5819.8
T E	2214.3	2037.2	2120.4	2647.8	2582.0	3692.6	3050.0	3105.2	3472.5	3444.1	3534.5	3908.0	3195.3	3500.9	4639.4	4161.6	4691.6	6160.7
CER	38.852	25.810	21.727	21.150	18.552	45.981	37.957	42.335	22.837	20.882	23.104	17.098	5.070	8.369	13.295	7.151	6.750	5.533
BASIC CALCULATIONS	∑XCi/n=7849.0/9 = 872.11			∑XOi/n=17073.0/9 = 1897.00			∑TEi/n=24922.0/9 = 2769.11			∑XCi/n=4231.0/9 = 470.11			∑XOi/n=33005.1/9 = 3667.23			∑TEi/n=37236.1/9 = 4137.34		

n=9					
	CER(t)	$CER_{(1)}$ =31.49423461		$CER_{(2)}$ =11.36261463	
	θ (m$)	– 402.00 (– 14.52%)			
	λ (m$)	+ 1770.23 (63.93%)			
	ΔTE (m$)	+ 1368.23 (*GTE* 49.41%)			
	ΔCER (%)	– 20.13161998 ≈ – 20.13			
		Point 1	CER effects	TE effects	**Point 2**
	np (m$)	1897.00	+ 832.91	+ 937.32	3667.23
	p (m$)	872.11	– 832.91	+ 430.91	470.11
	Total (m$)	2769.11	0	+ 1368.23	4137.34
	Piont4	p4=1303.02, np4=2834.32			
	ETO (m$)	+ 832.91	ETOV	+ 63.922	

Unit : Million US Dollars (m$) at current price
XC = Crude oil export, XO = Other sectors plus refined export,
T E = Total export (f.o.b), CER = Crude Export Ratio, (na) means not available,
Sources: UNCTAD Handbook of Statistics 2005 [online]. Available from: http://stats.unctad.org/Handbook/TableViewer/tableView.aspx (XC), http://stats.unctad.org/Handbook/TableViewer/tableView.aspx?ReportId=135 (TE)

Gabon

Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	na	968.2	696.5	1189.6	1660.0	1978.6	1836.5	2326.0	2048.2	2543.1	2557.4	2012.6	2132.8	1585.9	2118.4	2056.8	1970.2	na
XO	na	477.1	498.5	409.0	553.0	264.4	245.5	311.0	342.8	584.9	588.2	618.5	470.0	486.2	483.2	464.7	440.9	na
T E	1270.6	1445.3	1195.0	1598.6	2213.0	2243.0	2082.0	2637.0	2391.0	3128.0	3145.6	2631.1	2602.8	2072.1	2601.6	2521.5	2411.1	3199.3
CER	na	66.990	58.285	74.415	75.011	88.212	88.208	88.206	85.663	81.301	81.301	76.493	81.943	76.536	81.427	81.570	81.714	na
BASIC CALCULATIONS	∑XCi/n=12703.6/8 = 1587.95			∑XOi/n=3101.3/8 = 387.66			∑TEi/n=15804.9/8 = 1975.61			∑XCi/n=16977.2/8 = 2122.15			∑XOi/n=4136.6/8 = 517.08			∑TEi/n=21113.8/8 = 2639.23		

n=8					
	CER(t)	$CER_{(1)}$ =80.37770613		$CER_{(2)}$ =80.40792201	
	θ (m$)	+ 534.20 (27.04%)			
	λ (m$)	+ 129.42 (6.55%)			
	ΔTE (m$)	+ 663.62 (*GTE* 33.59%)			
	ΔCER (%)	+ 0.03021588 ≈ + 0.03			
		Point 1	CER effects	TE effects	**Point 2**
	np (m$)	387.66	– 0.8	+ 130.22	517.08
	p (m$)	1587.95	+ 0.8	+ 533.40	2122.15
	Total (m$)	1975.61	0	+ 663.62	2639.23
	Piont4	P4=2121.35, np4=517.88			
	ETO (m$)	– 0.8	ETOV	– 0.154	

Unit : Million US Dollars (m$) at current price
XC = Crude oil export, XO = Other sectors plus refined export,
T E = Total export (f.o.b), CER = Crude Export Ratio, (na) means not available,
Sources: UNCTAD Handbook of Statistics 2005 [online]. Available from: http://stats.unctad.org/Handbook/TableViewer/tableView.aspx (XC), http://stats.unctad.org/Handbook/TableViewer/tableView.aspx?ReportId=135 (TE)

IR Iran

Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	na	10346.2	9664.6	11810.5	17586.4	15448.3	16261.0	13685.4	15358.4	15531.9	18942.0	15549.7	10227.8	16648.7	24226.0	18997.2	23919.6	28179.0
XO	na	1150.5	1044.4	1270.5	1718.6	3212.7	3607.0	4394.6	3805.6	2828.1	3449.0	2875.6	3013.3	3359.5	3545.3	4141.8	4436.2	5609.0
T E	7171.0	11496.7	10709.0	13081.0	19305.0	18661.0	19868.0	18080.0	19164.0	18360.0	22391.0	18425.3	13241.1	20008.2	27771.3	23139.0	28355.8	33788.0
CER	na	89.993	90.247	90.287	91.098	82.784	81.845	75.694	80.142	84.596	84.596	84.393	77.243	83.209	87.234	82.100	84.355	83.399
BASIC CALCULATIONS	∑XCi/n=110160.8/8 = 13770.10			∑XOi/n=20203.9/8 = 2525.49			∑TEi/n=130364.7/8 = 16295.59			∑XCi/n=144042.9/8 = 18005.36			∑XOi/n=27648.8/8 = 3456.10			∑TEi/n=171691.7/8 = 21461.46		

n=8					
	CER(t)	$CER_{(1)}$ =84.5020033		$CER_{(2)}$ =83.89624937	
	θ (m$)	+ 4235.26 (25.99%)			
	λ (m$)	+ 930.61 (5.71%)			
	ΔTE (m$)	+ 5165.87 (*GTE* 31.70%)			
	ΔCER (%)	– 0.60575393 ≈ – 0.61			
		Point 1	CER effects	TE effects	**Point 2**
	np (m$)	2525.49	+ 130.00	+ 800.61	3456.10
	p (m$)	13770.10	– 130.00	+ 4365.26	18005.36
	Total (m$)	16295.59	0	+ 5165.87	21461.46
	Piont4	p4=18135.36, np4=3326.10			
	ETO (m$)	+ 130.00	ETOV	+ 0.717	

Unit : Million US Dollars (m$) at current price
XC = Crude oil export, XO = Other sectors plus refined export,
T E = Total export (f.o.b), CER = Crude Export Ratio, (na) means not available,
Sources: UNCTAD Handbook of Statistics 2005 [online]. Available from: http://stats.unctad.org/Handbook/TableViewer/tableView.aspx (XC), http://stats.unctad.org/Handbook/TableViewer/tableView.aspx?ReportId=135 (TE)

Kuwait

Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	3614.8	3755.4	3377.3	4852.3	3545.5	515.9	4292.3	7395.2	6507.2	6885.3	8248.7	7373.0	4890.8	5797.1	11612.2	9470.0	9806.9	12198.9
C (TBD)	756	607	698	850	645	85	696	1440	1263.5	1186.4	1224.2	1134.2	1190	948.2	1230.7	1214.1	1138	1242.9
Price	13.1	16.95	13.22	15.64	15.06	16.63	16.85	14.07	14.11	15.90	18.41	17.81	11.26	16.75	25.78	21.37	23.61	26.89
PE	6378	7523	6840	10432	6385	874	6221	9711	10459	12054	14132	13468	8472	11026	18185	14980	14060	19005
XO	3636.2	4508.6	4380.7	6623.7	3496.5	572.1	2279.7	2850.8	4752.8	5894.7	6640.3	6849.0	4662.2	6367.9	7823.8	6742.0	5544.1	8476.1
T E	7251.0	8264.0	7758.0	11476.0	7042.0	1088.0	6572.0	10246.0	11260.0	12780.0	14889.0	14222.0	9553.0	12165.0	19436.0	16212.0	15351.0	20675.0
CER	49.852	45.443	43.533	42.282	50.348	47.417	65.312	72.176	57.790	53.876	55.401	51.842	51.196	47.654	59.746	58.414	63.884	59.003
BASIC CALCULATIONS	∑XCi/n=37855.9/9 = 4206.21			∑XOi/n=33101.1/9 = 3677.90			∑TEi/n=70957.0/9 = 7884.11			∑XCi/n=76282.9/9 = 8475.88			∑XOi/n=59000.1/9 = 6555.56			∑TEi/n=135283.0/9 = 15031.44		

n=9					
CER(t)	$CER_{(1)}$ =53.35047329			$CER_{(2)}$ =56.38767809	
θ (m$)	+ 4269.67 (54.15%)				
λ (m$)	+ 2877.66 (36.50%)				
ΔTE (m$)	+ 7147.33 (*GTE* 90.65%)				
ΔCER (%)	+ 3.0372048 ≈ + 3.04				
	Point 1	CER effects	TE effects	**Point 2**	
np (m$)	3677.90	– 456.54	+ 3334.20	6555.56	
p (m$)	4206.21	+ 456.54	+ 3813.13	8475.88	
Total (m$)	7884.11	0	+ 7147.33	15031.44	
Piont4	P4=8019.34, np4=7012.10				
ETO (m$)	– 456.54	ETOV	– 6.511		

Unit : Million US Dollars (m$) at current price
XC = Crude oil export (value), XO = Other sectors plus refined export, T E = Total export (f.o.b), CER = Crude Export Ratio, C = Crude oil export (volume)
PE = Total petroleum export, Sources: OPEC Annual Statistical Bulletin 2004. (TE, PE, C and Price 95-03)
OPEC Annual Statistical Bulletin 1999. (Price 90, 92-94)
BP Statistical Review of World Energy June 2004 (Price 86-89, 91)
XC (m$) was calculated by (C × P × 0.365) for normal year and (C × P × 0.366) for leap year which are 1988, 1992, 1996 and 2000.

Libya

Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	na	na	4751.8	5769.3	9476.8	9088.6	8438.9	6920.0	6520.7	7037.3	8659.1	7884.0	5466.6	6544.4	10538.3	8903.7	8961.0	11924.0
C (TBD)	1051.0	804.0	882.0	868.0	1090.0	1220.0	1180.0	1110.0	1125.0	1120.3	1123.4	1115.7	1161.0	991.7	1005.0	987.6	983.6	1126.5
Price	na	na	14.72	18.21	23.82	20.41	19.54	17.08	15.88	17.21	21.06	19.36	12.9	18.08	28.65	24.7	24.96	29
XO	na	na	1921.2	2264.7	3748.2	2145.4	2354.1	1624.0	1344.3	1472.7	1495.9	1692.0	565.4	1416.6	2177.7	2433.3	2526.0	2126.0
T E	7711.0	7986.0	6673.0	8034.0	13225.0	11234.0	10793.0	8544.0	7865.0	8510.0	10155.0	9576.0	6032.0	7961.0	12716.0	11337.0	11487.0	14050.0
CER	na	na	71.209	71.811	71.658	80.903	78.189	80.993	82.908	82.694	85.269	82.331	90.627	82.206	82.874	78.537	78.010	84.868

BASIC CALCULATIONS	∑XCi/n=50966.1/7 = 7280.87	∑XOi/n=15401.9/7 = 2200.27	∑TEi/n=66368.0/7 = 9481.14	∑XCi/n=55033.4/7 = 7861.91	∑XOi/n=11253.6/7 = 1607.66	∑TEi/n=66287.0/7 = 9469.57

n=7					
	CER(t)	$CER_{(1)}$ =76.79319154		$CER_{(2)}$ =83.02288277	
	θ (m$)	+ 581.04 (+ 6.13%)			
	λ (m$)	– 592.61 (– 6.25%)			
	ΔTE (m$)	– 11.57 (*GTE* – 0.12%)			
	ΔCER (%)	+ 6.229691231 ≈ + 6.23			
		Point 1	CER effects	TE effects	**Point 2**
	np (m$)	2200.27	– 589.92	– 2.69	1607.66
	p (m$)	7280.87	+ 589.92	– 8.88	7861.91
	Total (m$)	9481.14	0	– 11.57	9469.57
	Piont4	P4=7271.99, np4=2197.58			
	ETO (m$)	– 589.92	ETOV	– 26.844	

Unit : Million US Dollars (m$) at current price
XC = Crude oil export, XO = Other sectors plus refined export,
T E = Total export (f.o.b), CER = Crude Export Ratio, (na) means not available,
Sources: OPEC Annual Statistical Bulletin 1996,1999 and 2004
XC = C × P × 0.365 for normal years and XC = C × P × 0.366 based on (Crude oil export volume = C and P = Spot Price)

Nigeria

Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	na	6981.6	6206.4	7544.9	9820.8	12375.9	11133.5	9354.6	8406.5	11108.9	10862.1	10577.7	6658.7	15952.4	26904.7	17732.2	16598.0	23211.2
XO	na	401.4	668.8	600.5	420.8	452.0	653.3	568.4	969.2	366.3	531.8	586.2	210.2	171.1	174.5	313.9	2009.1	867.1
T E	5922.7	7383.0	6875.2	8145.4	10241.6	12827.9	11786.8	9923.0	9375.7	11475.2	11393.9	11163.9	6868.9	16123.5	27079.2	18046.1	18607.1	24078.3
CER	na	94.563	91.366	92.628	95.891	96.476	94.457	94.272	89.663	96.808	95.333	94.749	96.940	98.940	99.356	98.261	89.203	96.400
BASIC CALCULATIONS	∑XCi/n=71824.2/8 = 8978.03			∑XOi/n=4734.4/8 = 591.80			∑TEi/n=76558.6/8 = 9569.83			∑XCi/n=116394.7/8 = 14549.34			∑XOi/n=4363.1/8 = 545.39			∑TEi/n=120757.8/8 = 15094.73		

n=8					
CER(t)	*$CER_{(1)}$ =93.8159821*			*$CER_{(2)}$ =96.38688469*	
θ (m$)	+ 5571.31 (58.22%)				
λ (m$)	– 46.41 (– 0.49%)				
ΔTE (m$)	+ 5524.90 (*GTE* 57.73%)				
ΔCER (%)	+ 2.570902594 ≈ + 2.57				
	Point 1	CER effects	TE effects	**Point 2**	
np (m$)	591.80	– 388.07	+ 341.66	545.39	
p (m$)	8978.03	+ 388.07	+ 5183.24	14549.34	
Total (m$)	9569.83	0	+ 5524.90	15094.73	
Piont4	P4=14161.27, np4=933.46				
ETO (m$)	– 388.07	ETOV	– 41.573		

Unit : Million US Dollars (m$) at current price
XC = Crude oil export, XO = Other sectors plus refined export,
T E = Total export (f.o.b), CER = Crude Export Ratio, (na) means not available,
Sources: UNCTAD Handbook of Statistics 2005 [online]. Available from: http://stats.unctad.org/Handbook/TableViewer/tableView.aspx (XC), http://stats.unctad.org/Handbook/TableViewer/tableView.aspx?ReportId=135 (TE)

Norway

Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	3870.0	5524.5	5123.5	8633.3	11962.7	12424.4	13304.9	12590.5	13168.6	15330.9	20987.8	19299.3	12079.4	17117.4	29339.3	26765.1	25802.3	29019.9
XO	14347.0	15994.3	17387.7	18403.4	22109.7	21623.5	21844.1	19313.4	21574.9	26409.4	27967.2	29250.5	28322.4	28361.9	30559.8	32191.1	33772.4	38919.8
T E	18217.0	21518.8	22511.2	27036.7	34072.4	34047.9	35149.0	31903.9	34743.5	41740.3	48955.0	48549.8	40401.8	45479.3	59899.1	58956.2	59574.7	67939.7
CER	21.244	25.673	22.760	31.932	35.110	36.491	37.853	39.464	37.902	36.729	42.872	39.752	29.898	37.638	48.981	45.398	43.311	42.714
BASIC CALCULATIONS	∑XCi/n=86602.4/9 = 9622.49			∑XOi/n=172598.0/9 = 19177.55			∑TEi/n=259200.4/9 = 28800.04			∑XCi/n=195741.4/9 = 21749.04			∑XOi/n=275754.5/9 = 30639.39			∑TEi/n=471495.9/9 = 52388.43		

n=9					
	CER(t)	*$CER_{(1)}$ =33.41136819*		*$CER_{(2)}$ =41.5149681*	
	θ (m$)	+ 12126.55 (42.10%)			
	λ (m$)	+ 11461.84 (39.80%)			
	ΔTE (m$)	+ 23588.39 (*GTE* 81.90%)			
	ΔCER (%)	+ 8.10359991 ≈ 8.10			
		Point 1	CER effects	TE effects	**Point 2**
	np (m$)	19177.55	– 4245.35	+ 15707.19	30639.39
	p (m$)	9622.49	+ 4245.35	+ 7881.20	21749.04
	Total (m$)	28800.04	0	+ 23588.39	52388.43
	Piont4	P4=17503.69, np4=34884.74			
	ETO (m$)	– 4245.35	ETOV	– 12.170	

Unit : Million US Dollars (m$) at current price
XC = Crude oil export, XO = Other sectors plus refined export,
T E = Total export (f.o.b), CER = Crude Export Ratio, (na) means not available,
Sources: UNCTAD Handbook of Statistics 2005 [online]. Available from: http://stats.unctad.org/Handbook/TableViewer/tableView.aspx (XC), http://stats.unctad.org/Handbook/TableViewer/tableView.aspx?ReportId=135 (TE)

Oman																		
Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	na	3453.8	2865.3	3496.5	4904.8	4096.5	4540.4	4148.0	4107.7	4606.9	5764.7	5647.4	3586.0	5376.5	8727.2	7632.8	7423.7	7762.0
XO	na	322.3	403.0	436.3	599.6	777.0	910.8	1151.5	1310.6	1310.5	1457.2	1983.3	1932.8	1854.4	2125.1	3403.8	3703.6	3602.5
T E	na	3776.1	3268.3	3932.8	5504.4	4873.5	5451.2	5299.5	5418.3	5917.4	7221.9	7630.7	5518.8	7230.9	10852.3	11036.6	11127.3	11364.5
CER	na	91.465	87.669	88.906	89.107	84.057	83.292	78.272	75.812	77.853	79.822	74.009	64.978	74.355	80.418	69.159	66.716	68.300

BASIC CALCULATIONS	∑XCi/n=17689.7/3 = 5896.56	∑XOi/n=5912.3/3 = 1970.77	∑TEi/n=23602.0/3 = 7867.33	∑XCi/n=22818.5/3 = 7606.16	∑XOi/n=10709.9/3 = 3569.97	∑TEi/n=33528.4/3 = 11176.13

n=3					
	CER(t)	*$CER_{(1)}$ =74.94995125*		*$CER_{(2)}$ =68.05718974*	
	θ (m$)	+ 1709.60 (21.73%)			
	λ (m$)	+ 1599.20 (20.33%)			
	ΔTE (m$)	+ 3308.80 (*GTE* 42.06%)			
	ΔCER (%)	– 6.892761507 ≈ – 6.89			
		Point 1	CER effects	TE effects	**Point 2**
	np (m$)	1970.77	+ 770.34	+ 828.86	3569.97
	p (m$)	5896.56	– 770.34	+ 2479.94	7606.16
	Total (m$)	7867.33	0	+ 3308.80	11176.13
	Piont4	p4=8376.50, np4=2799.63			
	ETO (m$)	+ 770.34	ETOV	+ 9.196	

Unit : Million US Dollars (m$) at current price
XC = Crude oil export, XR = Refined export, XO = Other sectors plus refined export, T E = Total export (f.o.b), CER = Crude Export Ratio,
Sources: UNCTAD Handbook of Statistics 2005 [online]. Available from: http://stats.unctad.org/Handbook/TableViewer/tableView.aspx (XC), http://stats.unctad.org/Handbook/TableViewer/tableView.aspx?ReportId=135 (TE)

Qatar																		
Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	1420.1*	1484.3	1504.7	1906.9	2782.8	2235.1	2486.9	2116.5	2010.7	2320.4	2558.9	2145.9	2984.8	4013.0	3840.6	5610.5	2881.4	6716.8
XO	648.6	499.1	922.5	831.1	858.4	974.7	1353.8	1128.9	1202.2	1236.8	1274.0	1710.0	2045.6	3197.9	5006.4	5095.4	5349.5	6665.8
T E	2068.7	1983.4	2427.2	2738.0	3641.2	3209.8	3840.7	3245.4	3212.9	3557.2	3832.9	3855.9	5030.4	7210.9	8847.0	10705.9	8230.9	13382.6
CER	68.647	74.836	61.993	69.646	76.425	69.634	64.751	65.215	62.582	65.231	66.761	55.652	59.335	55.652	43.411	52.406	35.007	50.191
BASIC CALCULATIONS	∑XCi/n=17364.0/8 = 2170.50			∑XOi/n=8508.4/8 = 1063.55			∑TEi/n=25872.4/8 = 3234.05			∑XCi/n=30751.9/8 = 3843.99			∑XOi/n=30344.6/8 = 3793.07			∑TEi/n=61096.5/8 = 7637.06		

n=8					
	CER(t)	*$CER_{(1)}$ =67.1139902*		*$CER_{(2)}$ =50.33337436*	
	θ (m$)	+ 1673.49 (51.75%)			
	λ (m$)	+ 2729.52 (84.40%)			
	ΔTE (m$)	+ 4403.01 (*GTE* 136.15%)			
	ΔCER (%)	– 16.78061584 ≈ – 16.78			
		Point 1	CER effects	TE effects	**Point 2**
	np (m$)	1063.55	+ 1281.55	+ 1447.97	3793.07
	p (m$)	2170.50	– 1281.55	+ 2955.04	3843.99
	Total (m$)	3234.05	0	+ 4403.01	7637.06
	Piont4	P4=5125.54, np4=2511.52			
	ETO (m$)	+ 1281.55	ETOV	+ 25.003	

Unit : Million US Dollars (m$) at current price
XC = Crude oil export (value), XO = Other sectors plus refined export, T E = Total export (f.o.b), CER = Crude Export Ratio,
Sources: UNCTAD Handbook of Statistics 2005 [online]. Available from: http://stats.unctad.org/Handbook/TableViewer/tableView.aspx (XC), http://stats.unctad.org/Handbook/TableViewer/tableView.aspx?ReportId=135 (TE), OPEC Annual Statistical Bulletin 2004 (C 86), BP Statistical Review of World Energy June 2004 (Price 86) * XC = C × P × 0.365 based on (Crude oil export volume = C = 297.0 and P = Price = 13.1)

Saudi Arabia

Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	15615.4*	15569.9	14700.9	18858.3	32918.8	37332.0	39602.6	32017.8	31967.5	36336.4	41699.0	42833.4	27354.1	34556.2	61397.7	55290.2	55064.0	58467.6
XO	4569.4	6973.7	9674.5	9510.6	11497.6	10334.6	13883.8	10378.0	10906.7	12693.2	14810.5	15213.4	12452.9	13905.2	16313.4	18112.5	8661.2	20498.0
T E	20184.8	22543.6	24375.4	28368.9	44416.4	47666.6	53486.4	42395.8	42874.2	49029.6	56509.5	58046.8	39807.0	48461.4	77711.1	73402.7	63725.2	78965.6
CER	77.362	69.066	60.310	66.475	74.114	78.319	74.042	75.521	74.561	74.111	73.791	73.791	68.717	71.307	79.008	75.324	86.409	74.042
BASIC CALCULATIONS	∑XCi/n=238583.2/9 = 26509.24			∑XOi/n=87728.9/9 = 9747.66			∑TEi/n=326312.1/9 = 36256.90			∑XCi/n=412998.6/9 = 45888.73			∑XOi/n=132660.3/9 = 14740.03			∑TEi/n=545658.9/9 = 60628.76		

n=9					
	CER(t)	$CER_{(1)}$ =73.11502086		$CER_{(2)}$ =75.6880563	
	θ (m$)	+ 19379.49 (53.45%)			
	λ (m$)	+ 4992.37 (13.77%)			
	ΔTE (m$)	+ 24371.86 (*GTE* 67.22%)			
	ΔCER (%)	+ 2.573035435 ≈ + 2.57			
		Point 1	CER effects	TE effects	**Point 2**
	np (m$)	9747.66	– 1560.00	+ 6552.37	14740.03
	p (m$)	26509.24	+ 1560.00	+ 17819.49	45888.73
	Total (m$)	36256.90	0	+ 24371.86	60628.76
	Piont4	p4=44328.73, np4=16300.03			
	ETO (m$)	– 1560.00	ETOV	– 9.571	

Unit : Million US Dollars (m$) at current price
XC = Crude oil export (value), XO = Other sectors plus refined export, T E = Total export (f.o.b), CER = Crude Export Ratio,
Sources: UNCTAD Handbook of Statistics 2005 [online]. Available from: http://stats.unctad.org/Handbook/TableViewer/tableView.aspx (XC), http://stats.unctad.org/Handbook/TableViewer/tableView.aspx?ReportId=135 (TE), OPEC Annual Statistical Bulletin 2004 (C 86), BP Statistical Review of World Energy June 2004 (Price 86) * XC = C × P × 0.365 based on (Crude oil export volume = C = 3265.8 and P = Price = 13.1)

Syria																		
Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	336.1	448.7	325.6	814.3	1469.8	1573.9	1850.6	1804.9	1885.4	2205.1	2540.8	2173.5	1378.5	2180.0	3203.7	3586.0	4243.4	3583.6
XO	990.1	901.7	1018.8	2191.5	2743.9	1856.2	1242.5	1473.0	1508.8	1764.8	1469.5	1649.7	1426.1	1209.0	1429.3	1462.0	2293.0	2147.1
T E	1326.2	1350.4	1344.4	3005.8	4213.7	3430.1	3093.1	3277.9	3394.2	3969.9	4010.3	3823.2	2804.6	3389.0	4633.0	5048.0	6536.4	5730.7
CER	25.343	33.227	24.219	27.091	34.881	45.885	59.830	55.063	55.548	55.545	63.357	56.850	49.151	64.326	69.150	71.038	64.920	62.533
BASIC CALCULATIONS	∑XCi/n=10509.3/9 = 1167.70			∑XOi/n=13926.5/9 = 1547.39			∑TEi/n=24435.8/9 = 2715.09			∑XCi/n=25094.6/9 = 2788.29			∑XOi/n=14850.5/9 = 1650.05			∑TEi/n=39945.1/9 = 4438.34		
n=9	CER(t)	*$CER_{(1)}$ =43.00778243*								*$CER_{(2)}$ =62.82281213*								
	θ (m$)	+ 1620.59 (59.69%)																
	λ (m$)	+ 102.66 (3.78%)																
	ΔTE (m$)	+ 1723.25 (*GTE* 63.47%)																
	ΔCER (%)	+ 19.8150297 ≈ + 19.82																
		Point 1			CER effects			TE effects				**Point 2**						
	np (m$)	1547.39			– 879.46			+ 982.12				1650.05						
	p (m$)	1167.70			+ 879.46			+ 741.13				2788.29						
	Total (m$)	2715.09			0			+ 1723.25				4438.34						
	Piont4	P4=1908.83, np4=2529.51																
	ETO (m$)			– 879.46				ETOV				– 34.768						

Unit : Million US Dollars (m$) at current price
XC = Crude oil export, XO = Other sectors plus refined export,
T E = Total export (f.o.b), CER = Crude Export Ratio, (na) means not available,
Sources: UNCTAD Handbook of Statistics 2005 [online]. Available from: http://stats.unctad.org/Handbook/TableViewer/tableView.aspx (XC), http://stats.unctad.org/Handbook/TableViewer/tableView.aspx?ReportId=135 (TE)

Unite Arab Emirates

Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	5392.6	7667.2	6394.1	9071.0	13104.0	12288.0	12938.0	10749.8	10518.1	11312.3	13171.6	12968.5	9087.1	12082.5	17403.4	14875.4	13985.5	20018.6
C (TBD)	1127.8	1239.3	1321.5	1589.0	1761.6	2024.4	2060.0	1970.0	1955.0	1925.0	1943.2	1949.0	2039.0	1919.0	1814.9	1786.7	1614.0	2048.0
Price	13.10	16.95	13.22	15.64	20.38	16.63	17.16	14.95	14.74	16.10	18.52	18.23	12.21	17.25	26.20	22.81	23.74	26.78
PE	6865	7900	7627	10215	14846	14356	14251	12118	11683	12822	14980	15269	11131	15021	26148	22414	21768	25153
XO	4736.4	5097.8	5855.9	8525.0	10440.0	12148.0	11818.0	12890.2	16871.9	17863.7	20441.4	21045.5	21971.9	24412.5	32474.6	33897.6	38177.5	45807.4
T E	10129.0	12765.0	12250.0	17596.0	23544.0	24436.0	24756.0	23640.0	27390.0	29176.0	33613.0	34014.0	31059.0	36495.0	49878.0	48773.0	52163.0	65826.0
CER	53.239	60.064	52.197	51.551	55.657	50.286	52.262	45.473	38.401	38.773	39.186	38.127	29.258	33.107	34.892	30.499	26.811	30.411
BASIC CALCULATIONS	∑XCi/n=86375.3/8 = 10796.91			∑XOi/n=96412.7/8 = 12051.59			∑TEi/n=182788.0/8 = 22848.50			∑XCi/n=113592.6/8 = 14199.08			∑XOi/n=238228.4/8 = 29778.55			∑TEi/n=351821.0/8 = 43977.63		

n=8					
	CER(t)	$CER_{(1)}$ =47.2543493		$CER_{(2)}$ =32.28705139	
	θ (m$)	+ 3402.17 (14.89%)			
	λ (m$)	+ 17726.96 (77.58%)			
	ΔTE (m$)	+ 21129.13 (*GTE* 92.47%)			
	ΔCER (%)	– 14.96729791 ≈ – 14.97			
		Point 1	CER effects	TE effects	**Point 2**
	np (m$)	12051.59	+ 6582.26	+ 11144.70	29778.55
	p (m$)	10796.91	– 6582.26	+ 9984.43	14199.08
	Total (m$)	22848.50	0	+ 21129.13	43977.63
	Piont4	P4=20781.34, np4=23196.29			
	ETO (m$)	+ 6582.26	ETOV	+ 31.674	

Unit : Million US Dollars (m$) at current price
XC = Crude oil export (value), XO = Other sectors plus refined export, T E = Total export (f.o.b), CER = Crude Export Ratio, C = Crude oil export (volume)
PE = Total petroleum export, Sources: OPEC Annual Statistical Bulletin 2004. (TE, PE, C)
BP Statistical Review of World Energy June 2004 (Price 1986-2003)
XC (m$) was calculated by (C × P × 0.365) for normal year and (C × P × 0.366) for leap year which are 1988, 1992, 1996 and 2000.

Venezuela

Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	3992.4	11744.6	4566.7	5774.4	14377.5	7608.0	7189.5	7318.8	8004.3	8576.3	12615.4	12176.8	7788.1	10775.3	18238.0	14755.9	18322.8	20235.8
XO	4620.4	4679.1	5391.4	7322.0	3666.7	7521.9	7045.8	8051.4	8494.9	10510.9	10456.9	10713.0	9266.0	9300.9	12710.1	10548.4	5664.4	4738.5
T E	8612.8	16423.7	9958.1	13096.4	18044.2	15129.9	14235.3	15370.2	16499.2	19087.2	23072.3	22889.8	17054.1	20076.2	30948.1	25304.3	23987.2	24974.3
CER	46.354	71.510	45.859	44.092	79.679	50.285	50.505	47.617	48.513	44.932	54.678	53.197	45.667	53.672	58.931	58.314	76.386	81.026
BASIC CALCULATIONS	∑XCi/n=70576.2/9 = 7841.80			∑XOi/n=56793.6/9 = 6310.40			∑TEi/n=127369.8/9 = 14152.20			∑XCi/n=123484.4/9 = 13720.49			∑XOi/n=83909.1/9 = 9323.23			∑TEi/n=207393.5/9 = 23043.72		

n=9					
	CER(t)	*$CER_{(1)}$ =55.41046622*		*$CER_{(2)}$ =59.54112444*	
	θ (m$)	+ 5878.69 (41.54%)			
	λ (m$)	+ 3012.83 (21.29%)			
	ΔTE (m$)	+ 8891.52 (*GTE* 62.83%)			
	ΔCER (%)	+ 4.13065822 ≈ + 4.13			
		Point 1	CER effects	TE effects	**Point 2**
	np (m$)	6310.40	– 951.86	+ 3964.69	9323.23
	p (m$)	7841.80	+ 951.86	+ 4926.83	13720.49
	Total (m$)	14152.20	0	+ 8891.52	23043.72
	Piont4	P4=12768.63, np4=10275.09			
	ETO (m$)	– 951.86		ETOV	– 9.264

Unit : Million US Dollars (m$) at current price
XC = Crude oil export, XO = Other sectors plus refined export,
T E = Total export (f.o.b), CER = Crude Export Ratio, (na) means not available,
Sources: UNCTAD Handbook of Statistics 2005 [online]. Available from: http://stats.unctad.org/Handbook/TableViewer/tableView.aspx (XC), http://stats.unctad.org/Handbook/TableViewer/tableView.aspx?ReportId=135 (TE)

Yemen

Year	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03
XC	na	na	365.8	656.8	103.3	na	na	271.1	693.5	1719.8	2779.2	2203.1	1227.1	2162.4	3676.0	2927.9	2819.1	3069.4
XO	na	na	149.2	184.5	15.5	na	na	102.6	79.6	197.6	426.6	305.6	273.7	275.4	401.7	163.3	258.7	664.0
T E	93.3	102.3	515.0	841.3	118.8	202.3	327.0	373.7	773.1	1917.4	3205.8	2508.7	1500.8	2437.8	4077.7	3091.2	3077.8	3733.4
CER	na	na	71.029	78.070	86.953	na	na	72.545	89.704	89.694	86.693	87.818	81.763	88.703	90.149	94.717	91.595	82.215

BASIC CALCULATIONS	∑XCi/n=2090.5/5 = 418.10	∑XOi/n=531.4/5 = 106.28	∑TEi/n=2621.9/5 = 524.38	∑XCi/n=10091.6/5 = 2018.32	∑XOi/n=1478.9/5 = 295.78	∑TEi/n=11570.5/5 = 2314.10

n=5					
	CER(t)	$CER_{(1)}$ =79.73225523		$CER_{(2)}$ =87.21835703	
	θ (m$)	+ 1600.22 (305.16%)			
	λ (m$)	+ 189.5 (36.14%)			
	ΔTE (m$)	+ 1789.72 (*GTE* 341.30%)			
	ΔCER (%)	+ 7.486101799 ≈ + 7.49			
		Point 1	CER effects	TE effects	**Point 2**
	np (m$)	106.28	– 173.24	+ 362.74	295.78
	p (m$)	418.10	+ 173.24	+ 1426.98	2018.32
	Total (m$)	524.38	0	+ 1789.72	2314.10
	Piont4	P4=1845.08, np4=469.02			
	ETO (m$)	– 173.24	ETOV	– 36.937	

Unit : Million US Dollars (m$) at current price
XC = Crude oil export, XO = Other sectors plus refined export,
T E = Total export (f.o.b), CER = Crude Export Ratio, (na) means not available,
Sources: UNCTAD Handbook of Statistics 2005 [online]. Available from: http://stats.unctad.org/Handbook/TableViewer/tableView.aspx (XC), http://stats.unctad.org/Handbook/TableViewer/tableView.aspx?ReportId=135 (TE)

Estimates of Per Capita GNI in US Dollars				Estimates of Per Capita GDP in US Dollars			
Country or Area	Period	Per Capita GNI		Country or Area	Period	Per Capita GDP	
Algeria	1986	2710		Algeria	1986	2772	
Algeria	1987	2691		Algeria	1987	2756	
Algeria	1988	2368		Algeria	1988	2446	
Algeria	1989	2179		Algeria	1989	2249	
Algeria	1990	2365		Algeria	1990	2447	
Algeria	1991	1715		Algeria	1991	1800	
Algeria	1992	1773		Algeria	1992	1854	
Algeria	1993	1813		Algeria	1993	1876	
Algeria	1994	1470		Algeria	1994	1530	
Algeria	1995	1413	2049.7	Algeria	1995	1488	2121.8
Angola	1986	649		Angola	1986	677	
Angola	1987	729		Angola	1987	760	
Angola	1988	712		Angola	1988	802	
Angola	1989	815		Angola	1989	910	
Angola	1990	709		Angola	1990	977	
Angola	1991	1089		Angola	1991	1121	
Angola	1992	570		Angola	1992	1247	
Angola	1993	536		Angola	1993	875	
Angola	1994	418		Angola	1994	873	
Angola	1995	296	652.3	Angola	1995	407	864.9
Brunei Darussalam	1986	15422		Brunei Darussalam	1986	10282	
Brunei Darussalam	1987	17506		Brunei Darussalam	1987	11671	
Brunei Darussalam	1988	16621		Brunei Darussalam	1988	11080	
Brunei Darussalam	1989	17994		Brunei Darussalam	1989	11997	
Brunei Darussalam	1990	21407		Brunei Darussalam	1990	13972	
Brunei Darussalam	1991	21809		Brunei Darussalam	1991	14497	
Brunei Darussalam	1992	21658		Brunei Darussalam	1992	14822	
Brunei Darussalam	1993	20774		Brunei Darussalam	1993	14578	
Brunei Darussalam	1994	23816		Brunei Darussalam	1994	15238	
Brunei Darussalam	1995	26772	20377.9	Brunei Darussalam	1995	17686	13582.3
Cameroon	1986	1227		Cameroon	1986	1243	
Cameroon	1987	1256		Cameroon	1987	1293	
Cameroon	1988	1185		Cameroon	1988	1221	
Cameroon	1989	1035		Cameroon	1989	1078	
Cameroon	1990	1178		Cameroon	1990	1228	
Cameroon	1991	1034		Cameroon	1991	1103	
Cameroon	1992	1065		Cameroon	1992	1129	
Cameroon	1993	916		Cameroon	1993	970	
Cameroon	1994	620		Cameroon	1994	655	
Cameroon	1995	641	1015.7	Cameroon	1995	672	1059.2

Estimates of Per Capita GNI in US Dollars				Estimates of Per Capita GDP in US Dollars			
Country or Area	Period	Per Capita GNI		Country or Area	Period	Per Capita GDP	
Congo	1986	792		Congo	1986	847	
Congo	1987	906		Congo	1987	1019	
Congo	1988	820		Congo	1988	950	
Congo	1989	841		Congo	1989	1008	
Congo	1990	942		Congo	1990	1127	
Congo	1991	913		Congo	1991	1063	
Congo	1992	978		Congo	1992	1108	
Congo	1993	856		Congo	1993	982	
Congo	1994	498		Congo	1994	627	
Congo	1995	590	813.6	Congo	1995	726	945.7
Ecuador	1986	1110		Ecuador	1986	1207	
Ecuador	1987	1025		Ecuador	1987	1100	
Ecuador	1988	951		Ecuador	1988	1021	
Ecuador	1989	906		Ecuador	1989	979	
Ecuador	1990	961		Ecuador	1990	1040	
Ecuador	1991	1052		Ecuador	1991	1119	
Ecuador	1992	1122		Ecuador	1992	1178	
Ecuador	1993	1252		Ecuador	1993	1373	
Ecuador	1994	1370		Ecuador	1994	1660	
Ecuador	1995	1463	1121.2	Ecuador	1995	1772	1244.9
Egypt	1986	582		Egypt	1986	641	
Egypt	1987	608		Egypt	1987	669	
Egypt	1988	645		Egypt	1988	696	
Egypt	1989	670		Egypt	1989	723	
Egypt	1990	696		Egypt	1990	751	
Egypt	1991	708		Egypt	1991	764	
Egypt	1992	758		Egypt	1992	818	
Egypt	1993	820		Egypt	1993	885	
Egypt	1994	929		Egypt	1994	1003	
Egypt	1995	1024	744	Egypt	1995	1105	805.5
Gabon	1986	3909		Gabon	1986	4682	
Gabon	1987	3671		Gabon	1987	4432	
Gabon	1988	3513		Gabon	1988	4249	
Gabon	1989	3611		Gabon	1989	4518	
Gabon	1990	5027		Gabon	1990	5668	
Gabon	1991	4937		Gabon	1991	5464	
Gabon	1992	4480		Gabon	1992	5478	
Gabon	1993	4516		Gabon	1993	5132	
Gabon	1994	3316		Gabon	1994	3858	
Gabon	1995	3730	4071	Gabon	1995	4433	4791.4
Iran	1986	1437		Iran	1986	1444	
Iran	1987	1674		Iran	1987	1684	
Iran	1988	1690		Iran	1988	1705	
Iran	1989	1617		Iran	1989	1636	
Iran	1990	1577		Iran	1990	1595	
Iran	1991	1650		Iran	1991	1641	
Iran	1992	1657		Iran	1992	1665	
Iran	1993	1790		Iran	1993	1797	
Iran	1994	1737		Iran	1994	1767	
Iran	1995	1744	1657.3	Iran	1995	1757	1669.1

Estimates of Per Capita GNI in US Dollars				Estimates of Per Capita GDP in US Dollars			
Country or Area	Period	Per Capita GNI		Country or Area	Period	Per Capita GDP	
Kuwait	1986	13932		Kuwait	1986	9815	
Kuwait	1987	14289		Kuwait	1987	11512	
Kuwait	1988	13546		Kuwait	1988	10071	
Kuwait	1989	15227		Kuwait	1989	11428	
Kuwait	1990	12172		Kuwait	1990	8619	
Kuwait	1991	7873		Kuwait	1991	5273	
Kuwait	1992	12698		Kuwait	1992	10046	
Kuwait	1993	14929		Kuwait	1993	12984	
Kuwait	1994	15894		Kuwait	1994	14292	
Kuwait	1995	18981	13954.1	Kuwait	1995	16033	11007.3
Libyan Arab Jamahiriya	1986	5763		Libyan Arab Jamahiriya	1986	5779	
Libyan Arab Jamahiriya	1987	5216		Libyan Arab Jamahiriya	1987	5224	
Libyan Arab Jamahiriya	1988	5840		Libyan Arab Jamahiriya	1988	5728	
Libyan Arab Jamahiriya	1989	6031		Libyan Arab Jamahiriya	1989	5925	
Libyan Arab Jamahiriya	1990	6697		Libyan Arab Jamahiriya	1990	6527	
Libyan Arab Jamahiriya	1991	7263		Libyan Arab Jamahiriya	1991	7078	
Libyan Arab Jamahiriya	1992	7347		Libyan Arab Jamahiriya	1992	7161	
Libyan Arab Jamahiriya	1993	6572		Libyan Arab Jamahiriya	1993	6637	
Libyan Arab Jamahiriya	1994	6001		Libyan Arab Jamahiriya	1994	6070	
Libyan Arab Jamahiriya	1995	5240	6197	Libyan Arab Jamahiriya	1995	5312	6144.1
Nigeria	1986	485		Nigeria	1986	516	
Nigeria	1987	292		Nigeria	1987	326	
Nigeria	1988	342		Nigeria	1988	374	
Nigeria	1989	319		Nigeria	1989	347	
Nigeria	1990	327		Nigeria	1990	358	
Nigeria	1991	324		Nigeria	1991	351	
Nigeria	1992	293		Nigeria	1992	332	
Nigeria	1993	289		Nigeria	1993	323	
Nigeria	1994	263		Nigeria	1994	283	
Nigeria	1995	266	320	Nigeria	1995	289	349.9
Norway	1986	17925		Norway	1986	18229	
Norway	1987	21415		Norway	1987	21748	
Norway	1988	22893		Norway	1988	23492	
Norway	1989	22877		Norway	1989	23537	
Norway	1990	26564		Norway	1990	27374	
Norway	1991	26940		Norway	1991	27856	
Norway	1992	29023		Norway	1992	29680	
Norway	1993	26524		Norway	1993	27171	
Norway	1994	28057		Norway	1994	28561	
Norway	1995	33505	25572.3	Norway	1995	33946	26159.4

Estimates of Per Capita GNI in US Dollars				Estimates of Per Capita GDP in US Dollars			
Country or Area	Period	Per Capita GNI		Country or Area	Period	Per Capita GDP	
Qatar	1986	14713		Qatar	1986	13096	
Qatar	1987	14470		Qatar	1987	13301	
Qatar	1988	14704		Qatar	1988	14005	
Qatar	1989	14841		Qatar	1989	14402	
Qatar	1990	16219		Qatar	1990	15747	
Qatar	1991	14699		Qatar	1991	14284	
Qatar	1992	15923		Qatar	1992	15472	
Qatar	1993	14585		Qatar	1993	14172	
Qatar	1994	14731		Qatar	1994	14314	
Qatar	1995	15930	15081.5	Qatar	1995	15479	14427.2
Saudi Arabia	1986	5703		Saudi Arabia	1986	5379	
Saudi Arabia	1987	5434		Saudi Arabia	1987	5126	
Saudi Arabia	1988	5353		Saudi Arabia	1988	5049	
Saudi Arabia	1989	5582		Saudi Arabia	1989	5265	
Saudi Arabia	1990	6497		Saudi Arabia	1990	6390	
Saudi Arabia	1991	6902		Saudi Arabia	1991	6979	
Saudi Arabia	1992	6959		Saudi Arabia	1992	7091	
Saudi Arabia	1993	6551		Saudi Arabia	1993	6659	
Saudi Arabia	1994	6352		Saudi Arabia	1994	6595	
Saudi Arabia	1995	6714	6204.7	Saudi Arabia	1995	6841	6137.4
Syria	1986	829		Syria	1986	836	
Syria	1987	813		Syria	1987	845	
Syria	1988	918		Syria	1988	956	
Syria	1989	739		Syria	1989	797	
Syria	1990	786		Syria	1990	839	
Syria	1991	851		Syria	1991	910	
Syria	1992	964		Syria	1992	1026	
Syria	1993	1047		Syria	1993	1112	
Syria	1994	915		Syria	1994	933	
Syria	1995	974	883.6	Syria	1995	992	924.6
United Arab Emirates	1986	14662		United Arab Emirates	1986	14503	
United Arab Emirates	1987	14889		United Arab Emirates	1987	15036	
United Arab Emirates	1988	14207		United Arab Emirates	1988	14166	
United Arab Emirates	1989	15603		United Arab Emirates	1989	15538	
United Arab Emirates	1990	17891		United Arab Emirates	1990	18081	
United Arab Emirates	1991	17054		United Arab Emirates	1991	17218	
United Arab Emirates	1992	16728		United Arab Emirates	1992	16849	
United Arab Emirates	1993	16439		United Arab Emirates	1993	16337	
United Arab Emirates	1994	16976		United Arab Emirates	1994	16586	
United Arab Emirates	1995	18319	16276.8	United Arab Emirates	1995	17580	17693

Estimates of Per Capita GNI in US Dollars					Estimates of Per Capita GDP in US Dollars				
Country or Area	Period	Per Capita GNI			Country or Area	Period	Per Capita GDP		
Venezuela	1986	3300			Venezuela	1986	3402		
Venezuela	1987	2560			Venezuela	1987	2629		
Venezuela	1988	3119			Venezuela	1988	3210		
Venezuela	1989	2131			Venezuela	1989	2225		
Venezuela	1990	2389			Venezuela	1990	2463		
Venezuela	1991	2595			Venezuela	1991	2645		
Venezuela	1992	2834			Venezuela	1992	2921		
Venezuela	1993	2754			Venezuela	1993	2839		
Venezuela	1994	2616			Venezuela	1994	2702		
Venezuela	1995	3421	2771.9		Venezuela	1995	3504	2854	
Yemen	1989	324			Yemen	1989	325		
Yemen	1990	334			Yemen	1990	335		
Yemen	1991	333			Yemen	1991	340		
Yemen	1992	339			Yemen	1992	347		
Yemen	1993	346			Yemen	1993	352		
Yemen	1994	345			Yemen	1994	351		
Yemen	1995	369			Yemen	1995	381		
Yemen Arab Republic (Former)	1986	408		407.5	Yemen Arab Republic (Former)	1986	356		378
Yemen Arab Republic (Former)	1987	424		437	Yemen Arab Republic (Former)	1987	370		406
Yemen Arab Republic (Former)	1988	498		478	Yemen Arab Republic (Former)	1988	435		442.5
Yemen Democratic (Former)	1986	407			Yemen Democratic (Former)	1986	400		
Yemen Democratic (Former)	1987	450			Yemen Democratic (Former)	1987	442		
Yemen Democratic (Former)	1988	458	371.25		Yemen Democratic (Former)	1988	450	365.75	

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Appendix 11 ***Oil Exporting Nations' Processed Data Table***

Nation		Algeria					Angola				
Year	PRICE	OilProduction	WTO	XC	XO	TE	OilProduction	WTO	XC	XO	TE
1986	14.15	0.344925	0	3.12060	4.7101	7.8307	0.10293	0	0.81740	0.51460	1.332
1987	18.16	0.382520	0	3.72420	4.4617	8.1859	0.131400	0	2.15310	0.21240	2.3655
1988	14.7	0.38064	0	3.48400	4.6706	8.1546	0.165432	0	2.05980	0.43470	2.4945
1989	17.85	0.399675	0	4.17900	4.77	8.949	0.166075	0	2.38400	0.60480	2.9888
1990	22.87	0.428875	0	5.38540	5.6257	11.0111	0.173375	0	3.59880	0.31150	3.9103
1991	19.39	0.44895	0	5.06000	6.73	11.79	0.1825	0	3.12090	0.28880	3.4097
1992	19.02	0.444324	0	4.80670	6.3301	11.1368	0.192634	0	3.42400	0.27350	3.6975
1993	16.79	0.42424	0	4.44870	5.649	10.0977	0.185785	0	2.60220	0.24080	2.843
1994	15.92	0.4307	0	3.92450	4.6693	8.5938	0.19564	0	2.48960	0.29840	2.788
1995	17.18	0.438655	0	4.30980	5.0469	9.3567	0.23579	0	2.56700	0.34360	2.9106
1996	20.45	0.454625	0	5.32900	5.7702	11.0992	0.259415	0	4.59750	0.49750	5.095
1997	19.31	0.46601	0	5.64650	8.2476	13.8941	0.26061	1	4.60470	0.57630	5.181
1998	13.11	0.45494	0	4.08420	5.7544	9.8386	0.268305	1	2.99030	0.55270	3.543
1999	18.18	0.43884	0	4.97510	7.5502	12.5253	0.271925	1	4.53070	0.86630	5.397
2000	28.36	0.45893	0	9.25440	12.7769	22.0313	0.273184	1	6.80600	0.89600	7.702
2001	24.39	0.47815	0	7.13290	12.0072	19.1401	0.27097	1	5.58580	0.79400	6.3798
2002	24.97	0.476681	0	7.95640	10.8748	18.8312	0.327175	1	6.73170	0.77790	7.5096
2003	28.89	0.58803	0	11.34630	13.2652	24.6115	0.32943	1	8.69400	0.54340	9.2374

Nation		Brunei					Cameroon				
Year	PRICE	OilProduction	WTO	XC	XO	TE	OilProduction	WTO	XC	XO	TE
1986	14.15	0.06059	0	0.72970	1.0683	1.798	0.064605	0	0.07420	0.7066	0.7808
1987	18.16	0.050735	0	0.92780	0.9742	1.902	0.063510	0	0.14210	0.6873	0.8294
1988	14.7	0.050142	0	0.72570	0.9819	1.7076	0.059658	0	0.68230	0.2417	0.924
1989	17.85	0.04818	0	0.88150	1.0016	1.8831	0.06205	0	0.22960	1.052	1.2816
1990	22.87	0.05475	0	1.12620	1.0871	2.2133	0.058765	0	1.03480	1.0459	2.0807
1991	19.39	0.058838	0	1.27260	1.4095	2.6821	0.05595	0	0.91210	0.9219	1.834
1992	19.02	0.06049	0	1.24920	1.052	2.3012	0.05137	0	0.91510	0.9249	1.84
1993	16.79	0.060225	0	1.06530	1.0286	2.0939	0.046304	0	0.55020	1.3508	1.901
1994	15.92	0.061031	0	1.05200	1.0583	2.1103	0.0394	0	0.36890	0.9057	1.2746
1995	17.18	0.059495	1	1.04120	1.0474	2.0886	0.040515	0	0.44530	1.0934	1.5387
1996	20.45	0.056875	1	1.10270	1.5544	2.6571	0.039528	1	0.62800	1.1299	1.7579
1997	19.31	0.0584	1	1.10270	1.5544	2.6571	0.04526	1	0.61110	1.2482	1.8593
1998	13.11	0.057451	1	0.77830	1.5285	2.3068	0.043983	1	0.80440	0.8705	1.6749
1999	18.18	0.06643	1	1.16050	1.4551	2.6156	0.0365	1	0.76580	0.8288	1.5946
2000	28.36	0.070638	1	1.14730	1.4387	2.586	0.031045	1	0.88010	0.9525	1.8326
2001	24.39	0.071257	1	1.55650	1.9517	3.5082	0.027976	1	0.80950	0.9399	1.7494
2002	24.97	0.059495	1	1.68890	1.8768	3.5657	0.025484	1	0.82460	0.9771	1.8017
2003	28.89	0.06203	1	2.02210	2.1222	4.1443	0.024455	1	0.99930	1.2465	2.2458

Nation		Congo					Ecuador				
Year	PRICE	OilProduction	WTO	XC	XO	TE	OilProduction	WTO	XC	XO	TE
1986	14.15	0.043435	0	0.65770	0.1192	0.7769	0.106945	0	0.91240	1.2718	2.1842
1987	18.16	0.044895	0	0.73680	0.2733	1.0101	0.063510	0	0.64580	1.3749	2.0207
1988	14.7	0.052704	0	0.57190	0.1792	0.7511	0.110532	0	0.97570	1.2168	2.1925
1989	17.85	0.05986	0	0.71230	0.1966	0.9089	0.101835	0	1.03270	1.3212	2.3539
1990	22.87	0.060225	0	0.79610	0.1816	0.9777	0.104025	0	1.25840	1.456	2.7144
1991	19.39	0.05694	0	0.95260	0.0794	1.032	0.109135	0	1.05900	1.7924	2.8514
1992	19.02	0.063684	0	1.09200	0.091	1.183	0.117486	0	1.25100	1.7913	3.0423
1993	16.79	0.06608	0	0.89090	0.0744	0.9653	0.12544	0	1.14900	1.871	3.02
1994	15.92	0.0657	0	0.74670	0.1711	0.9178	0.133225	0	1.18500	2.6584	3.8434
1995	17.18	0.06862	0	0.93630	0.1535	1.0898	0.14309	0	1.39550	2.966	4.3615
1996	20.45	0.073566	0	1.23550	0.2026	1.4381	0.144859	1	1.52080	3.369	4.8898
1997	19.31	0.092345	1	1.32430	0.2172	1.5415	0.141708	1	1.40430	3.8098	5.2141
1998	13.11	0.096725	1	0.87930	0.4932	1.3725	0.137051	1	0.78900	3.414	4.203
1999	18.18	0.09855	1	1.01830	0.5368	1.5551	0.135999	1	1.31230	3.1388	4.4511
2000	28.36	0.10248	1	1.73290	0.7441	2.477	0.144541	1	2.14400	2.6779	4.8219
2001	24.39	0.093075	1	1.13820	0.4379	1.5761	0.150447	1	1.72230	2.9252	4.6475
2002	24.97	0.090959	1	1.24330	0.4054	1.6487	0.143273	1	1.83850	3.203	5.0415
2003	28.89	0.0901	1	1.38980	0.5183	1.9081	0.15002	1	2.37230	3.6662	6.0385

Nation		Egypt					Gabon				
Year	PRICE	OilProduction	WTO	XC	XO	TE	OilProduction	WTO	XC	XO	TE
1986	14.15	0.296745	0	0.86030	1.354	2.2143	0.06059	0	NA	NA	1.2706
1987	18.16	0.327040	0	0.52580	1.5114	2.0372	0.056575	0	0.96820	0.4771	1.4453
1988	14.7	0.310368	0	0.46070	1.6597	2.1204	0.058194	0	0.69650	0.4985	1.195
1989	17.85	0.315725	0	0.56000	2.0878	2.6478	0.07592	0	1.18960	0.409	1.5986
1990	22.87	0.318645	0	0.47900	2.103	2.582	0.09855	0	1.66000	0.553	2.213
1991	19.39	0.31901	0	1.69790	1.9947	3.6926	0.10731	0	1.97860	0.2644	2.243
1992	19.02	0.322525	0	1.15770	1.8923	3.05	0.10894	0	1.83650	0.2455	2.082
1993	16.79	0.32485	0	1.31460	1.7906	3.1052	0.114063	0	2.32600	0.311	2.637
1994	15.92	0.326931	0	0.79300	2.6795	3.4725	0.11992	0	2.04820	0.3428	2.391
1995	17.18	0.3358	1	0.71920	2.7249	3.4441	0.133225	1	2.54310	0.5849	3.128
1996	20.45	0.33733	1	0.81660	2.7179	3.5345	0.13482	1	2.55740	0.5882	3.1456
1997	19.31	0.312586	1	0.66820	3.2398	3.908	0.1352	1	2.01260	0.6185	2.6311
1998	13.11	0.304264	1	0.16200	3.0333	3.1953	0.12848	1	2.13280	0.47	2.6028
1999	18.18	0.31083	1	0.29300	3.2079	3.5009	0.120815	1	1.58590	0.4862	2.0721
2000	28.36	0.273768	1	0.61680	4.0226	4.6394	0.11529	1	2.11840	0.4832	2.6016
2001	24.39	0.254916	1	0.29760	3.864	4.1616	0.09855	1	2.05680	0.4647	2.5215
2002	24.97	0.230447	1	0.31670	4.3749	4.6916	0.091688	1	1.97020	0.4409	2.4111
2003	28.89	0.22563	1	0.34090	5.8198	6.1607	0.088117	1	NA	NA	3.1993

Appendix 11 ***Oil Exporting Nations' Processed Data Table***

Nation		Iran					Kuwait				
Year	PRICE	OilProduction	WTO	XC	XO	TE	OilProduction	WTO	XC	XO	TE
1986	14.15	0.742775	0	NA	NA	7.171	0.517935	0	3.61480	3.6362	7.251
1987	18.16	0.838770	0	10.34620	1.1505	11.4967	0.578525	0	3.75540	4.5086	8.264
1988	14.7	0.81984	0	9.66460	1.0444	10.709	0.546072	0	3.37730	4.3807	7.758
1989	17.85	1.02565	0	11.81050	1.2705	13.081	0.650795	0	4.85230	6.6237	11.476
1990	22.87	1.12712	0	17.58640	1.7186	19.305	0.428875	0	3.54550	3.4965	7.042
1991	19.39	1.20888	0	15.44830	3.2127	18.661	0.06935	0	0.51590	0.5721	1.088
1992	19.02	1.25505	0	16.26100	3.607	19.868	0.387265	0	4.29230	2.2797	6.572
1993	16.79	1.2921	0	13.68540	4.3946	18.08	0.676112	0	7.39520	2.8508	10.246
1994	15.92	1.32057	0	15.35840	3.8056	19.164	0.739125	0	6.50720	4.7528	11.26
1995	17.18	1.329775	0	15.53190	2.8281	18.36	0.750955	1	6.88530	5.8947	12.78
1996	20.45	1.34897	0	18.94200	3.449	22.391	0.754565	1	8.24870	6.6403	14.889
1997	19.31	1.337425	0	15.54970	2.8756	18.4253	0.732592	1	7.37300	6.849	14.222
1998	13.11	1.326325	0	10.22780	3.0133	13.2411	0.76115	1	4.89080	4.6622	9.553
1999	18.18	1.298305	0	16.64870	3.3595	20.0082	0.692661	1	5.79710	6.3679	12.165
2000	28.36	1.352846	0	24.22600	3.5453	27.7713	0.760731	1	11.61220	7.8238	19.436
2001	24.39	1.359151	0	18.99720	4.1418	23.139	0.729088	1	9.47000	6.742	16.212
2002	24.97	1.25717	0	23.91960	4.4362	28.3558	0.691368	1	9.80690	5.5441	15.351
2003	28.89	1.36612	0	28.17900	5.609	33.788	0.77964	1	12.19890	8.4761	20.675

Nation		Libya					Nigeria				
Year	PRICE	OilProduction	WTO	XC	XO	TE	OilProduction	WTO	XC	XO	TE
1986	14.15	0.37741	0	NA	NA	7.711	0.535455	0	NA	NA	5.9227
1987	18.16	0.354780	0	NA	NA	7.986	0.489465	0	6.98160	0.4014	7.383
1988	14.7	0.43005	0	4.75179	1.92121	6.673	0.5307	0	6.20640	0.6688	6.8752
1989	17.85	0.41975	0	5.76929	2.26471	8.034	0.62634	0	7.54490	0.6005	8.1454
1990	22.87	0.501875	0	9.47679	3.74821	13.225	0.66065	0	9.82080	0.4208	10.2416
1991	19.39	0.54135	0	9.08857	2.14543	11.234	0.690507	0	12.37590	0.452	12.8279
1992	19.02	0.524368	0	8.43894	2.35407	10.793	0.711138	0	11.13350	0.6533	11.7868
1993	16.79	0.496765	0	6.91996	1.62404	8.544	0.7154	0	9.35460	0.5684	9.923
1994	15.92	0.50282	0	6.52073	1.34428	7.865	0.704779	0	8.40650	0.9692	9.3757
1995	17.18	0.50735	0	7.03734	1.47266	8.51	0.727355	1	11.10890	0.3663	11.4752
1996	20.45	0.51271	0	8.65911	1.49589	10.155	0.732195	1	10.86210	0.5318	11.3939
1997	19.31	0.52776	0	7.88399	1.69201	9.576	0.778345	1	10.57770	0.5862	11.1639
1998	13.11	0.50735	0	5.46657	0.56543	6.032	0.786012	1	6.65870	0.2102	6.8689
1999	18.18	0.48142	0	6.54444	1.41656	7.961	0.777399	1	15.95240	0.1711	16.1235
2000	28.36	0.51607	0	10.53833	2.17767	12.716	0.79239	1	26.90470	0.1745	27.0792
2001	24.39	0.49879	0	8.90371	2.43329	11.337	0.823497	1	17.73220	0.3139	18.0461
2002	24.97	0.48126	0	8.96099	2.52601	11.487	0.77302	1	16.59800	2.0091	18.6071
2003	28.89	0.51849	0	11.92402	2.12598	14.05	0.830375	1	23.21120	0.8671	24.0783

Appendix 11 ***Oil Exporting Nations' Processed Data Table***

Nation		Norway					Oman				
Year	PRICE	OilProduction	WTO	XC	XO	TE	OilProduction	WTO	XC	XO	TE
1986	14.15	0.307144	0	3.87000	14.347	18.217	0.2044	0	NA	NA	NA
1987	18.16	0.358607	0	5.52450	15.9943	21.5188	0.212430	0	3.45380	0.3223	3.7761
1988	14.7	0.407391	0	5.12350	17.3877	22.5112	0.225822	0	2.86530	0.403	3.2683
1989	17.85	0.54115	0	8.63330	18.4034	27.0367	0.233965	0	3.49650	0.4363	3.9328
1990	22.87	0.594953	0	11.96270	22.1097	34.0724	0.250025	0	4.90480	0.5996	5.5044
1991	19.39	0.682866	0	12.42440	21.6235	34.0479	0.2555	0	4.09650	0.777	4.8735
1992	19.02	0.78027	0	13.30490	21.8441	35.149	0.27084	0	4.54040	0.9108	5.4512
1993	16.79	0.832752	0	12.59050	19.3134	31.9039	0.283178	0	4.14800	1.1515	5.2995
1994	15.92	0.937886	0	13.16860	21.5749	34.7435	0.29565	0	4.10770	1.3106	5.4183
1995	17.18	1.009527	1	15.33090	26.4094	41.7403	0.31072	0	4.60690	1.3105	5.9174
1996	20.45	1.13131	1	20.98780	27.9672	48.955	0.32332	0	5.76470	1.4572	7.2219
1997	19.31	1.146727	1	19.29930	29.2505	48.5498	0.32996	0	5.64740	1.9833	7.6307
1998	13.11	1.0991	1	12.07940	28.3224	40.4018	0.32844	0	3.58600	1.9328	5.5188
1999	18.18	1.101893	1	17.11740	28.3619	45.4793	0.33215	0	5.37650	1.8544	7.2309
2000	28.36	1.179075	1	29.33930	30.5598	59.8991	0.35502	0	8.72720	2.1251	10.8523
2001	24.39	1.177609	1	26.76510	32.1911	58.9562	0.333245	1	7.63280	3.4038	11.0366
2002	24.97	1.142663	1	25.80230	33.7724	59.5747	0.327304	1	7.42370	3.7036	11.1273
2003	28.89	1.110372	1	29.01990	38.9198	67.9397	0.298935	1	7.76200	3.6025	11.3645

Nation		Qatar					Saudi Arabia				
Year	PRICE	OilProduction	WTO	XC	XO	TE	OilProduction	WTO	XC	XO	TE
1986	14.15	0.11242	0	1.42010	0.6486	2.0687	1.77755	0	15.61540	4.5694	20.1848
1987	18.16	0.106945	0	1.48430	0.4991	1.9834	1.556725	0	15.56990	6.9737	22.5436
1988	14.7	0.126636	0	1.50470	0.9225	2.4272	1.861476	0	14.70090	9.6745	24.3754
1989	17.85	0.1387	0	1.90690	0.8311	2.738	1.84836	0	18.85830	9.5106	28.3689
1990	22.87	0.14819	0	2.78280	0.8584	3.6412	2.33965	0	32.91880	11.4976	44.4164
1991	19.39	0.144175	0	2.23510	0.9747	3.2098	2.961975	0	37.33200	10.3346	47.6666
1992	19.02	0.154891	0	2.48690	1.3538	3.8407	3.049402	0	39.60260	13.8838	53.4864
1993	16.79	0.150745	0	2.11650	1.1289	3.2454	2.9922	0	32.01780	10.378	42.3958
1994	15.92	0.151475	0	2.01070	1.2022	3.2129	2.9638	0	31.96750	10.9067	42.8742
1995	17.18	0.16133	0	2.32040	1.2368	3.5572	3.0044	0	36.33640	12.6932	49.0296
1996	20.45	0.186835	1	2.55890	1.274	3.8329	3.007815	0	41.69900	14.8105	56.5095
1997	19.31	0.20075	1	2.14590	1.71	3.8559	3.052142	0	42.83340	15.2134	58.0468
1998	13.11	0.253895	1	2.98480	2.0456	5.0304	3.06195	0	27.35410	12.4529	39.807
1999	18.18	0.242725	1	4.01300	3.1979	7.2109	2.859187	0	34.55620	13.9052	48.4614
2000	28.36	0.269815	1	3.84060	5.0064	8.847	3.07579	0	61.39770	16.3134	77.7111
2001	24.39	0.260665	1	5.61050	5.0954	10.7059	2.93135	0	55.29020	18.1125	73.4027
2002	24.97	0.247875	1	2.88140	5.3495	8.2309	2.786555	0	55.06400	8.6612	63.7252
2003	28.89	0.260975	1	6.71680	6.6658	13.3826	3.202875	0	58.46760	20.498	78.9656

Appendix 11 ***Oil Exporting Nations' Processed Data Table***

Nation		Syria					UAE				
Year	PRICE	OilProduction	WTO	XC	XO	TE	OilProduction	WTO	XC	XO	TE
1986	14.15	0.07081	0	0.336100	0.9901	1.3262	0.48545	0	5.39260	4.7364	10.129
1987	18.16	0.083950	0	0.448700	0.9017	1.3504	0.562465	0	7.66720	5.0978	12.765
1988	14.7	0.09699	0	0.325600	1.0188	1.3444	0.57279	0	6.39410	5.8559	12.25
1989	17.85	0.1241	0	0.814300	2.1915	3.0058	0.6789	0	9.07100	8.525	17.596
1990	22.87	0.14162	0	1.469800	2.7439	4.2137	0.772705	0	13.10400	10.44	23.544
1991	19.39	0.17958	0	1.573900	1.8562	3.4301	0.87089	0	12.28800	12.148	24.436
1992	19.02	0.176027	0	1.850600	1.2425	3.0931	0.829356	0	12.93800	11.818	24.756
1993	16.79	0.20221	0	1.804900	1.473	3.2779	0.788035	0	10.74980	12.8902	23.64
1994	15.92	0.2044	0	1.885400	1.5088	3.3942	0.800445	0	10.51810	16.8719	27.39
1995	17.18	0.209875	0	2.205100	1.7648	3.9699	0.815045	0	11.31230	17.8637	29.176
1996	20.45	0.213123	0	2.540800	1.4695	4.0103	0.83362	1	13.17160	20.4414	33.613
1997	19.31	0.20485	0	2.173500	1.6497	3.8232	0.845495	1	12.96850	21.0455	34.014
1998	13.11	0.20198	0	1.378500	1.4261	2.8046	0.856035	1	9.08710	21.9719	31.059
1999	18.18	0.19637	0	2.180000	1.209	3.389	0.791685	1	12.08250	24.4125	36.495
2000	28.36	0.191354	0	3.203700	1.4293	4.633	0.866625	1	17.40340	32.4746	49.878
2001	24.39	0.176638	0	3.586000	1.462	5.048	0.804825	1	14.87540	33.8976	48.773
2002	24.97	0.172363	0	4.243400	2.293	6.5364	0.759928	1	13.98550	38.1775	52.163
2003	28.89	0.169353	0	3.583600	2.1471	5.7307	0.85707	1	20.01860	45.8074	65.826

Nation		Venezuela					Yemen				
Year	PRICE	OilProduction	WTO	XC	XO	TE	OilProduction	WTO	XC	XO	TE
1986	14.15	0.652255	0	3.99240	4.6204	8.6128	0.00365	0	NA	NA	0.0933
1987	18.16	0.639480	0	11.74460	4.6791	16.4237	0.007300	0	NA	NA	0.1023
1988	14.7	0.696498	0	4.56670	5.3914	9.9581	0.063318	0	0.36580	0.1492	0.515
1989	17.85	0.696055	0	5.77440	7.322	13.0964	0.07081	0	0.65680	0.1845	0.8413
1990	22.87	0.780005	0	14.37750	3.6667	18.0442	0.070445	0	0.10330	0.0155	0.1188
1991	19.39	0.866875	0	7.60800	7.5219	15.1299	0.07175	0	NA	NA	0.2023
1992	19.02	0.867786	0	7.18950	7.0458	14.2353	0.06664	0	NA	NA	0.327
1993	16.79	0.89425	0	7.31880	8.0514	15.3702	0.0803	0	0.27110	0.1026	0.3737
1994	15.92	0.94462	0	8.00430	8.4949	16.4992	0.122275	0	0.69350	0.0796	0.7731
1995	17.18	1.0038	1	8.57630	10.5109	19.0872	0.12591	0	1.71980	0.1976	1.9174
1996	20.45	1.075308	1	12.61540	10.4569	23.0723	0.1246	0	2.77920	0.4266	3.2058
1997	19.31	1.1972	1	12.17680	10.713	22.8898	0.132279	0	2.20310	0.3056	2.5087
1998	13.11	1.15596	1	7.78810	9.266	17.0541	0.141547	0	1.22710	0.2737	1.5008
1999	18.18	1.031417	1	10.77530	9.3009	20.0762	0.149285	0	2.16240	0.2754	2.4378
2000	28.36	1.15473	1	18.23800	12.7101	30.9481	0.16105	0	3.67600	0.4017	4.0777
2001	24.39	1.09865	1	14.75590	10.5484	25.3043	0.160052	0	2.92790	0.1633	3.0912
2002	24.97	0.95044	1	18.32280	5.6644	23.9872	0.1618	0	2.81910	0.2587	3.0778
2003	28.89	0.852345	1	20.23580	4.7385	24.9743	0.163625	0	3.06940	0.664	3.7334

Notes:

1- Price (*$/barrel*): Crude petroleum, Average of Dubai/Brent/Texas equally weighted. For more information see Table 4.1.

2- OilProduction (*Billion Barrels Yearly*) calculated based on crude oil production volume in TABLE22 of EIA http://www.eia.doe.gov/emeu/international/ . The volume of crude oil export has been computed as follow for normal years:

$$Volume_i\,(billion\ barrels\ \ yearly) = Volume_i\,(thousand\ barrels\ daily) \times 365 \times 10^{-6}$$

Also for leap years we could write:

$$Volume_i\,(billion\ barrels\ \ yearly) = Volume_i\,(thousand\ barrels\ daily) \times 366 \times 10^{-6}$$

Where (i) denotes each specific year.

3- OilExport (XC), Non-oilExport (XO) and TE (*Billion US$ Yearly*): See Appendix09 for related sources.

4- WTO: WTO members list 2004 http://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm

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- 0 - Food and live animals
    - 00 - Live animals other than animals of division 03
    - 01 - Meat and meat preparations
    - 02 - Dairy products and birds' eggs
    - 03 - Fish (not marine mammals), crustaceans, molluscs and aquatic invertebrates, and preparations thereof
    - 04 - Cereals and cereal preparations
    - 05 - Vegetables and fruit
    - 06 - Sugars, sugar preparations and honey
    - 07 - Coffee, tea, cocoa, spices, and manufactures thereof
    - 08 - Feeding stuff for animals (not including unmilled cereals)
    - 09 - Miscellaneous edible products and preparations
- 1 - Beverages and tobacco
    - 11 - Beverages
    - 12 - Tobacco and tobacco manufactures
- 2 - Crude materials, inedible, except fuels
    - 21 - Hides, skins and furskins, raw
    - 22 - Oil-seeds and oleaginous fruits
    - 23 - Crude rubber (including synthetic and reclaimed)
    - 24 - Cork and wood
    - 25 - Pulp and waste paper
    - 26 - Textile fibres (other than wool tops and other combed wool) and their wastes (not manufactured into yarn or fabric)
    - 27 - Crude fertilizers, other than those of division 56, and crude minerals (excluding coal, petroleum and precious stones)
    - 28 - Metalliferous ores and metal scrap
    - 29 - Crude animal and vegetable materials, n.e.s.
- 3 - Mineral fuels, lubricants and related materials
    - 32 - Coal, coke and briquettes
    - 33 - Petroleum, petroleum products and related materials
    - 34 - Gas, natural and manufactured
    - 35 - Electric current

- 4 - Animal and vegetable oils, fats and waxes
    - 41 - Animal oils and fats
    - 42 - Fixed vegetable fats and oils, crude, refined or fractionated
    - 43 - Animal or vegetable fats and oils, processed; waxes of animal or vegetable origin; inedible mixtures or preparations of animal or vegetable fats or oils, n.e.s.
- 5 - Chemicals and related products, n.e.s.
    - 51 - Organic chemicals
    - 52 - Inorganic chemicals
    - 53 - Dyeing, tanning and colouring materials
    - 54 - Medicinal and pharmaceutical products
    - 55 - Essential oils and resinoids and perfume materials; toilet, polishing and cleansing preparations
    - 56 - Fertilizers (other than those of group 272)
    - 57 - Plastics in primary forms
    - 58 - Plastics in non-primary forms
    - 59 - Chemical materials and products, n.e.s.
- 6 - Manufactured goods classified chiefly by material
    - 61 - Leather, leather manufactures, n.e.s., and dressed furskins
    - 62 - Rubber manufactures, n.e.s.
    - 63 - Cork and wood manufactures (excluding furniture)
    - 64 - Paper, paperboard and articles of paper pulp, of paper or of paperboard
    - 65 - Textile yarn, fabrics, made-up articles, n.e.s., and related products
    - 66 - Non-metallic mineral manufactures, n.e.s.
    - 67 - Iron and steel
    - 68 - Non-ferrous metals
    - 69 - Manufactures of metals, n.e.s.
- 7 - Machinery and transport equipment
    - 71 - Power-generating machinery and equipment
    - 72 - Machinery specialized for particular industries
    - 73 - Metalworking machinery
    - 74 - General industrial machinery and equipment, n.e.s., and machine parts, n.e.s.

- 75 - Office machines and automatic data-processing machines
- 76 - Telecommunications and sound-recording and reproducing apparatus and equipment
- 77 - Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof (including non-electrical counterparts, n.e.s., of electrical household-type equipment)
- 78 - Road vehicles (including air-cushion vehicles)
- 79 - Other transport equipment

- 8 - Miscellaneous manufactured articles
  - 81 - Prefabricated buildings; sanitary, plumbing, heating and lighting fixtures and fittings, n.e.s.
  - 82 - Furniture, and parts thereof; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings
  - 83 - Travel goods, handbags and similar containers
  - 84 - Articles of apparel and clothing accessories
  - 85 - Footwear
  - 87 - Professional, scientific and controlling instruments and apparatus, n.e.s.
  - 88 - Photographic apparatus, equipment and supplies and optical goods, n.e.s.; watches and clocks
  - 89 - Miscellaneous manufactured articles, n.e.s.
- 9 - Commodities and transactions not classified elsewhere in the SITC
  - 91 - Postal packages not classified according to kind
  - 93 - Special transactions and commodities not classified according to kind
  - 96 - Coin (other than gold coin), not being legal tender
  - 97 - Gold, non-monetary (excluding gold ores and concentrates)
- I - Gold, monetary
- II - Gold coin and current coin

Appendix 12

UNCTAD 3-digit Code and commodity description	
001	Live animals for food
011	Meat, fresh, chilled, frozen
012	Meat dried, salted, smoked
014	Meat prepd, prsrvd nes, etc
022	Milk and cream
023	Butter
024	Cheese and curd
025	Eggs, yolks, fresh, prsrvd
034	Fish, fresh, chilled, frozen
035	Fish salted, dried, smoked
036	Shell fish fresh, frozen
037	Fish etc prepd, prsrvd nes
041	Wheat etc, unmilled
042	Rice
043	Barley, unmilled
044	Maize (corn), unmilled
045	Cereals nes, unmilled
046	Wheat etc, meal or flour
047	Other cereal meals, flour
048	Cereal etc preparations
054	Vegtb etc fresh, simply prsrvd
056	Vegtb etc prsrvd, preprd
057	Fruit, nuts, fresh, dried
058	Fruit prsrvd, preprd
061	Sugar and honey
062	Sugar preps non-chocolate
071	Coffee and substitutes
072	Cocoa
073	Chocolate and products
074	Tea and mate
075	Spices
081	Feeding stuff for animals
091	Margarine and shortening
098	Edible products, preps nes
111	Non alcoholic beverages nes
112	Alcoholic beverages
121	Tobacco, unmanufactd, refuse
122	Tobacco, manufactured
211	Hides skins, exc furs, raw
212	Furskins, raw
222	Seeds for soft fixed oils
223	Seeds for other fixed oils
232	Natural rubber, gums
233	Rubber, synthetic, reclaimed
244	Cork, natural, raw, waste
245	Fuel wood nes, charcoal
246	Pulpwood, chips, woodwaste
247	Other wood rough, squared
248	Wood, shaped, rail sleepers
251	Pulp and waste paper
261	Silk
263	Cotton
264	Jute, other textile bast fibres
265	Vegetb fibre, exc cotton, jute
266	Synthetic fibres for spinning
267	Other man-made fibres
268	Wool (exc tops), animal hair
269	Waste of textile fabrics
271	Fertilizers, crude
273	Stone, sand and gravel
274	Sulphur, unroastd iron pyrites
277	Natural abrasives nes
278	Other crude minerals
281	Iron ore and concentrates
282	Iron and steel scrap
286	Uranium, thorium ores, conc
287	Base metals ores, conc nes
288	Non-ferrous metal scrap nes
289	Prec metal ores, waste nes
291	Crude animal materials nes
292	Crude vegetb materials nes
322	Coal, lignite and peat
323	Briquettes, coke and semi-coke
333	Crude petroleum
334	Petroleum products, refined
335	Residual petroleum prdts nes
341	Gas, natural and manufactured
351	Electric current
411	Animal oils and fats
423	Fixed vegetable oils, soft
424	Other fixed vegetable oils
431	Procesd animl and veg oil, etc
511	Hydrocarbons nes, derivtives
512	Alcohols, phenols, etc
513	Carboxylic acids, etc
514	Nitrogen-function compounds
515	Organo-inorgan compounds, etc
516	Other organic chemicals
522	Inorg chem elmnt, oxides, etc
523	Other inorganic chemicals
524	Radioactive etc materials
531	Synth dye, natrl indigo, lakes
532	Dyes nes, tanning products
533	Pigments, paints, varnishes etc

UNCTAD 3-digit Code and commodity description	
541	Medicinal, pharmaceutical prdts
551	Essential oils, perfume, etc
553	Perfumery, cosmetics, etc
554	Soap, cleansing, etc preps
562	Fertilizers, manufactured
572	Explosives, pyrotechnic prdts
582	Prdts of condensation, etc
583	Polymerization, etc, prdts
584	Cellulose, derivatives, etc
585	Plastic materials nes
591	Pesticides, disinfectants
592	Starch, inulin, gluten, etc
598	Miscel chemical prdts nes
611	Leather
612	Leather, etc, manufactures
613	Fur skins tanned, dressed
621	Materials of rubber
625	Rubber tyres,tubes, etc
628	Rubber articles nes
633	Cork manufactures
634	Veneers, plywood, etc
635	Wood manufactures nes
641	Paper and paperboard
642	Paper and paperboard, cut
651	Textile yarn
652	Cotton fabrics, woven
653	Woven man-made fib fabric
654	Other woven textile fabric
655	Knitted, etc, fabric
656	Lace, ribbon, tulle, etc
657	Spec textile fabrics, products
658	Textile articles nes
659	Floor coverings, etc
661	Lime, cement and building prdts
662	Clay, refractory building prdts
663	Mineral manufactures nes
664	Glass
665	Glassware
666	Pottery
667	Pearl, prec, semi-prec stones
671	Pig iron, etc
672	Iron, steel primary forms
673	Iron, steel shapes, etc
674	Iron, steel univ, plate, sheet
675	Iron, steel hoop, strip
676	Railway rails etc, iron, steel
677	Iron, steel wire, exc w rod
678	Iron, steel tubes, pipes, etc

UNCTAD 3-digit Code and commodity description	
679	Iron, steel castings unworked
681	Silver, platinum, etc
682	Copper
683	Nickel
684	Aluminium
685	Lead
686	Zinc
687	Tin
688	Uranium, thorium, alloys
689	Non-fer base metals nes
691	Structures and parts nes
692	Metal tanks, boxes, etc
693	Wire products, non-electric
694	Stell, copper nails, nuts, etc
695	Tools
696	Cutlery
697	Base metal household equip
699	Base metal manufactures nes
711	Steam boilers and auxil parts
712	Steam engines, turbines
713	Intern combust piston engines
714	Engines and motors nes
716	Rotating electric plant
718	Oth power generating machinery
721	Agricult machinry exc tractor
722	Tractors non-road
723	Civil engineering equip, etc
724	Textile, leather machinery
725	Paper etc mill machinery
726	Print and bookbind machy, parts
727	Food machinery, non-demestic
728	Oth machy for spec industries
736	Metal working machy, tools
737	Metal working machinery nes
741	Heating, cooling equipment
742	Pumps for liquids, etc
743	Pumps nes, centrifuges, etc
744	Mechanical handling equipment
745	Non-electr machy, tools nes
749	Non-electr machy parts, acces
751	Office machines
752	Automatic data processing equip
759	Office, adp machy parts, acces
761	Television receivers
762	Radio-broadcast receivers
763	Sound recorders, phonographs
764	Telecom equip, parts, acces
771	Electric power machinery nes

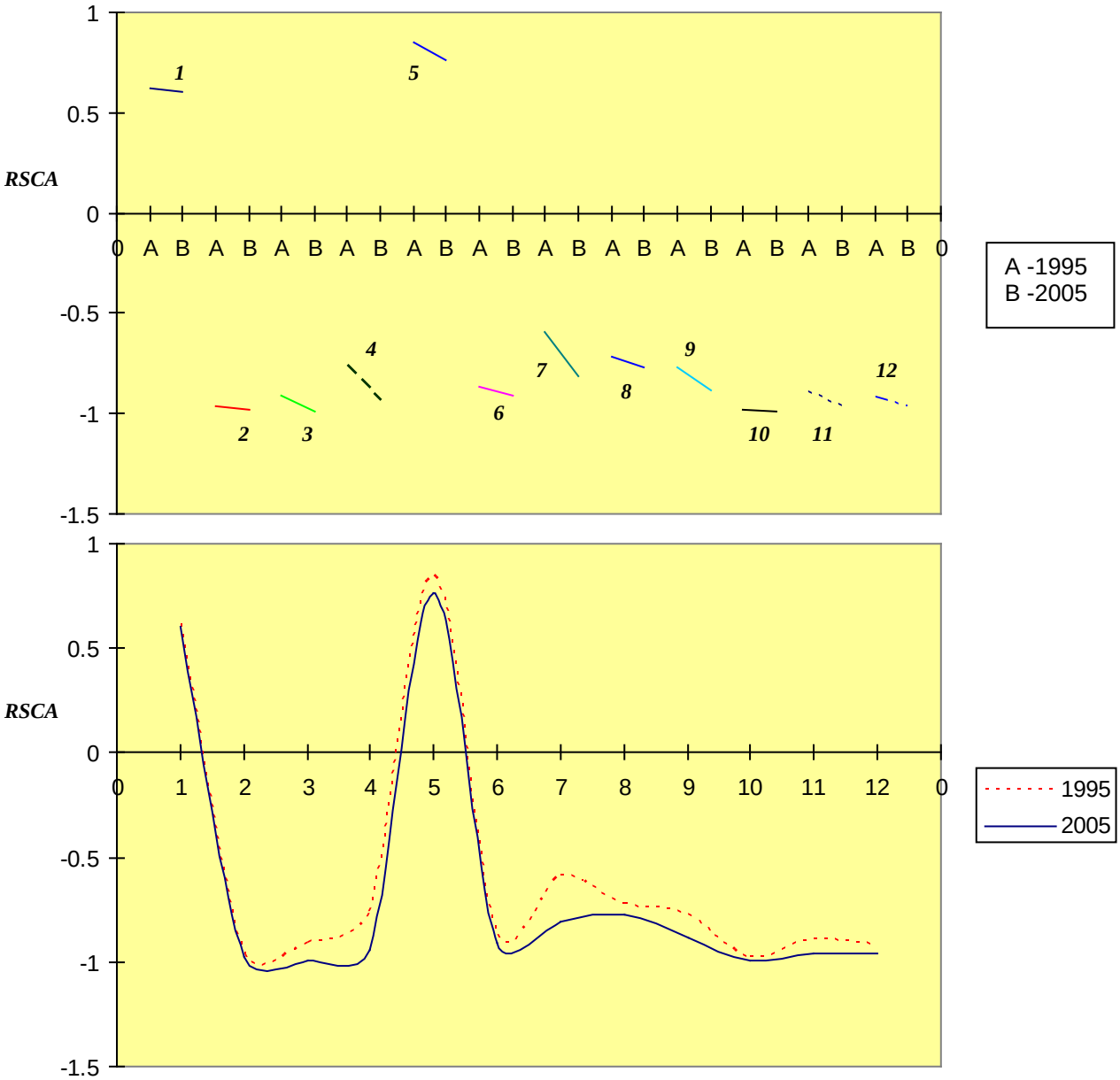
Appendix 12

UNCTAD 3-digit Code and commodity description	
772	Switchgear etc, parts nes
773	Electricity distributing equip
774	Electro-medical, xray equip
775	Household type equip nes
776	Transistors, valves, etc
778	Electrical machinery nes
781	Passengr motor vehicl, exc bus
782	Lorries, spec motor vehicl nes
783	Road motor vehicles nes
784	Motor vehicl parts, acces nes
785	Cycles, etc, motorized or not
786	Trailers, non-motor vehicl nes
791	Railway vehicles
792	Aircraft, etc
793	Ships, boats, etc
812	Plumbg, heatg, lightg equip
821	Furniture and parts thereof
831	Travel goods, handbags, etc
842	Men's outwear non-knit
843	Women's outwear non-knit
844	Under garments non-knit
845	Outer garments knit nonelastic
846	Under garments knitted
847	Textile clothing accessoris nes
848	Headgear, non-textile clothing

UNCTAD 3-digit Code and commodity description	
851	Footwear
871	Optical instruments
872	Medical instruments nes
873	Meters and counters nes
874	Measuring, controlg instruments
881	Photogr apparatus, equip nes
882	Photogr and cinema supplies
883	Developed cinema film
884	Optical goods nes
885	Watches and clocks
892	Printed matter
893	Articles of plastic nes
894	Toys, sporting goods, etc
895	Office supplies nes
896	Works of art, etc
897	Gold, silver ware, jewellery
898	Musical instruments and parts
899	Other manufactured goods
911	Mail not classified by kind
931	Special transactions
941	Zoo animals, pets, etc
951	War firearms, ammunition
961	Coin, non-gold, non-current
971	Gold, non-monetary nes

Source: UNCTAD, Trade Structure by product (1980-2004) based on SITC Revision 3
http://www.unctad.org/Templates/Page.asp?intItemID=1890&lang=1

Appendix 13: 1995-2005 RSCA analysis based on different product groups for Algeria

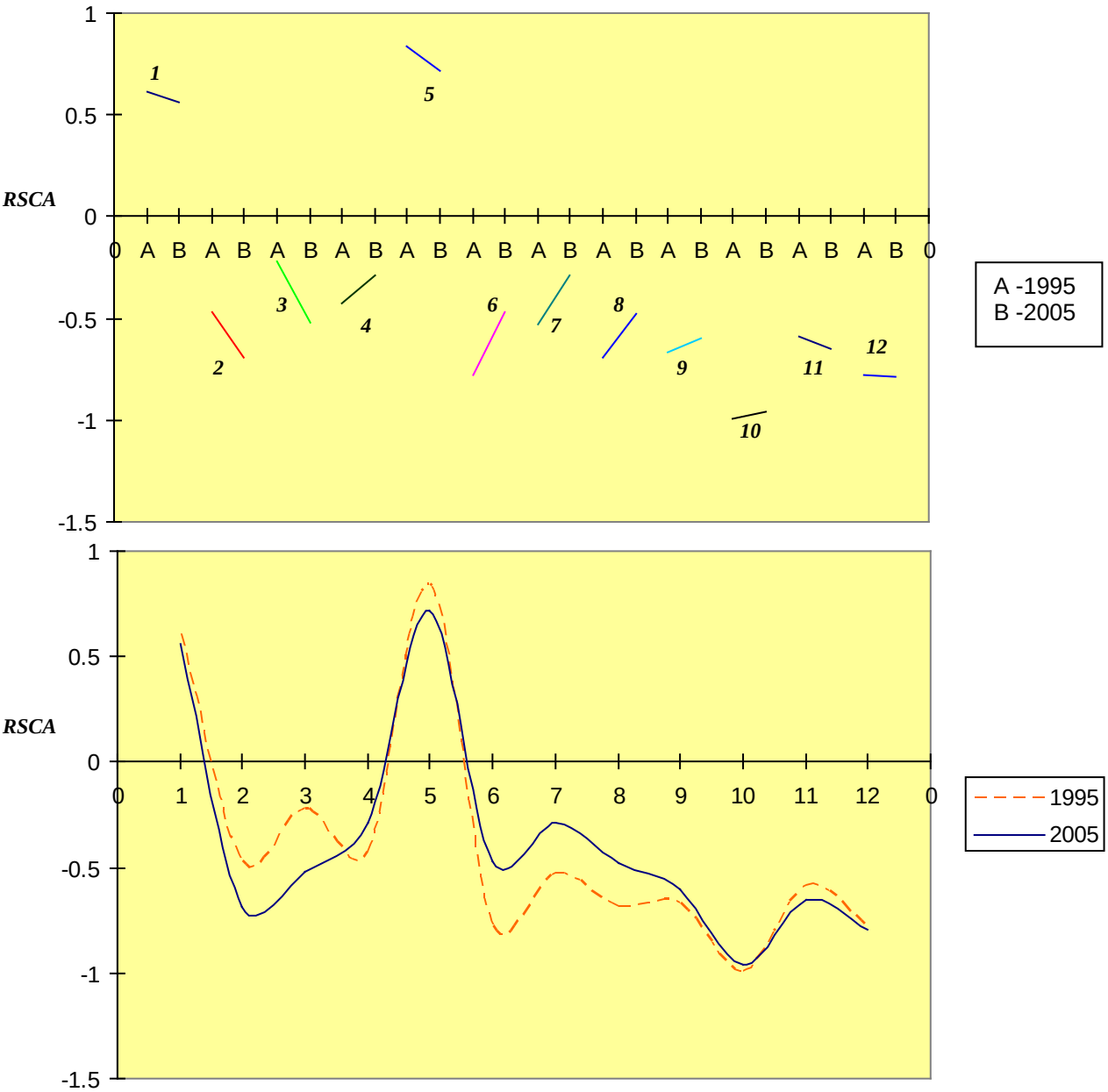


RSCA changes from 1995 to 2005 for Algeria												
Product Groups	1	2	3	4	5	6	7	8	9	10	11	12
1995	0.63	-0.96	-0.92	-0.77	0.85	-0.87	-0.59	-0.73	-0.77	-0.98	-0.90	-0.92
2005	0.60	-0.98	-1	-0.94	0.76	-0.91	-0.81	-0.78	-0.89	-0.99	-0.96	-0.97

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
6. *Non-ferrous metals (SITC 68)*
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

Appendix 13: 1995-2005 RSCA analysis based on different product groups for Iran

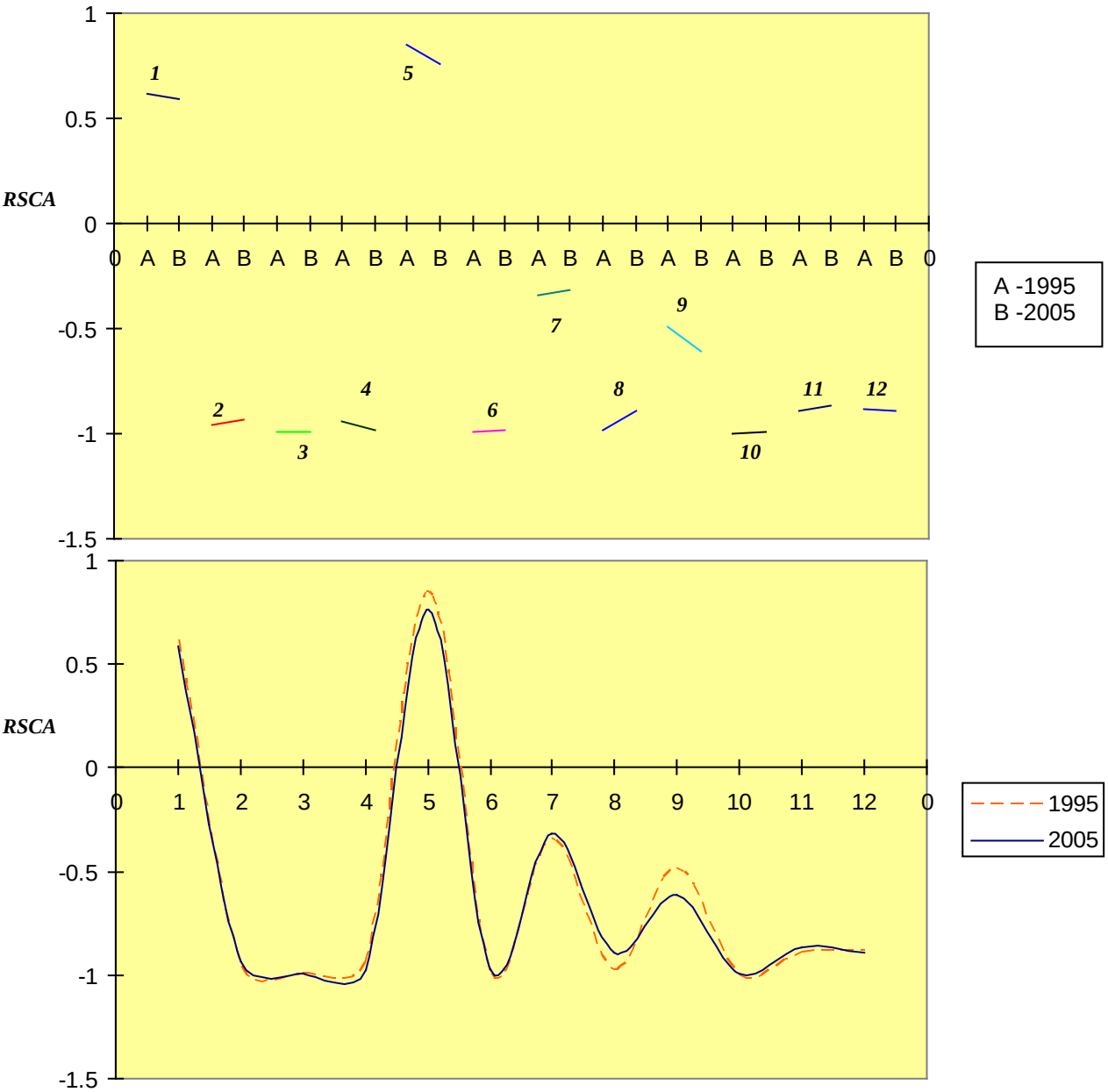


RSCA changes from 1995 to 2005 for Iran												
Product Groups	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1995	*0.61*	*-0.47*	*-0.22*	*-0.43*	*0.84*	*-0.78*	*-0.53*	*-0.69*	*-0.67*	*-0.99*	*-0.59*	*-0.78*
2005	*0.56*	*-0.69*	*-0.52*	*-0.29*	*0.72*	*-0.47*	*-0.29*	*-0.48*	*-0.60*	*-0.96*	*-0.65*	*-0.79*

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
6. *Non-ferrous metals (SITC 68)*
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

Appendix 13: 1995-2005 RSCA analysis based on different product groups for Libya

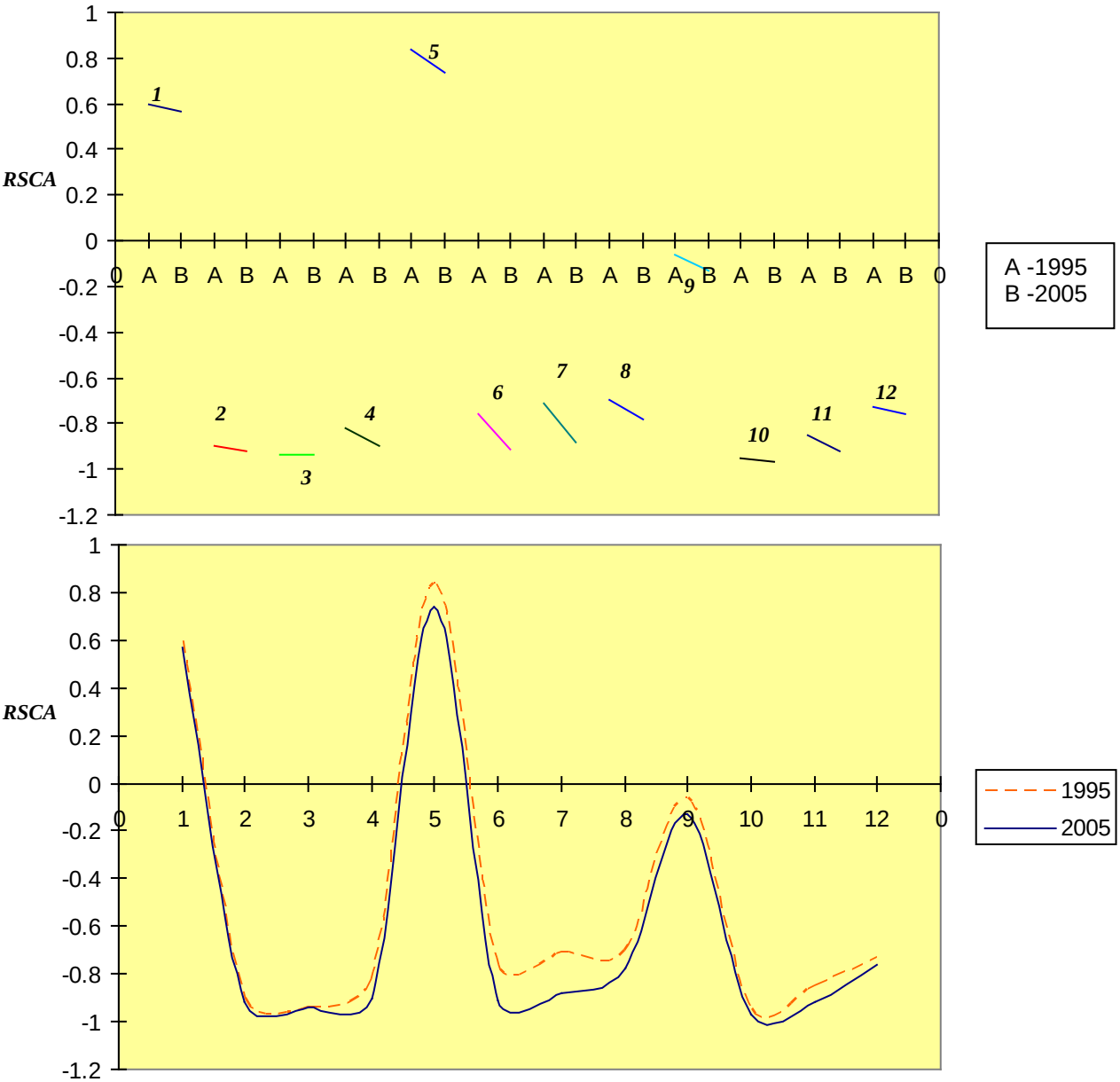


RSCA changes from 1995 to 2005 for Libya												
Product Groups	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1995	*0.62*	*-0.96*	*-0.99*	*-0.94*	*0.85*	*-0.99*	*-0.34*	*-0.98*	*-0.49*	*-1*	*-0.89*	*-0.88*
2005	*0.59*	*-0.93*	*-0.99*	*-0.98*	*0.76*	*-0.98*	*-0.32*	*-0.89*	*-0.61*	*-0.99*	*-0.87*	*-0.89*

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
6. *Non-ferrous metals (SITC 68)*
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

Appendix 13: 1995-2005 RSCA analysis based on different product groups for Saudi Arabia

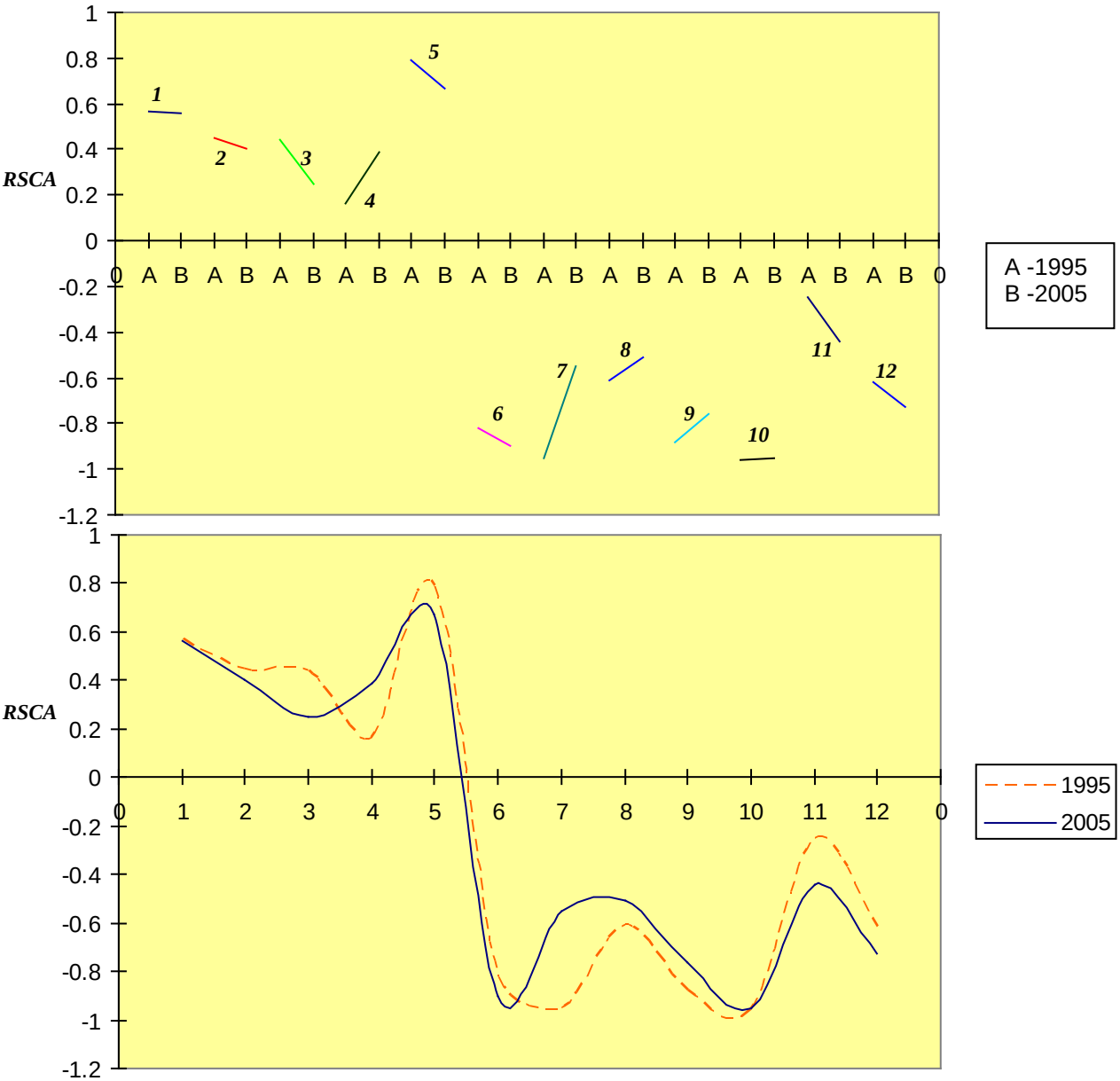


RSCA changes from 1995 to 2005 for S. Arabia												
Product Groups	1	2	3	4	5	6	7	8	9	10	11	12
1995	0.60	-0.90	-0.94	-0.82	0.84	-0.76	-0.71	-0.70	-0.06	-0.95	-0.85	-0.73
2005	0.57	-0.92	-0.94	-0.90	0.74	-0.91	-0.88	-0.78	-0.13	-0.97	-0.92	-0.76

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
6. *Non-ferrous metals (SITC 68)*
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

Appendix 13: 1995-2005 RSCA analysis based on different product groups for Syria

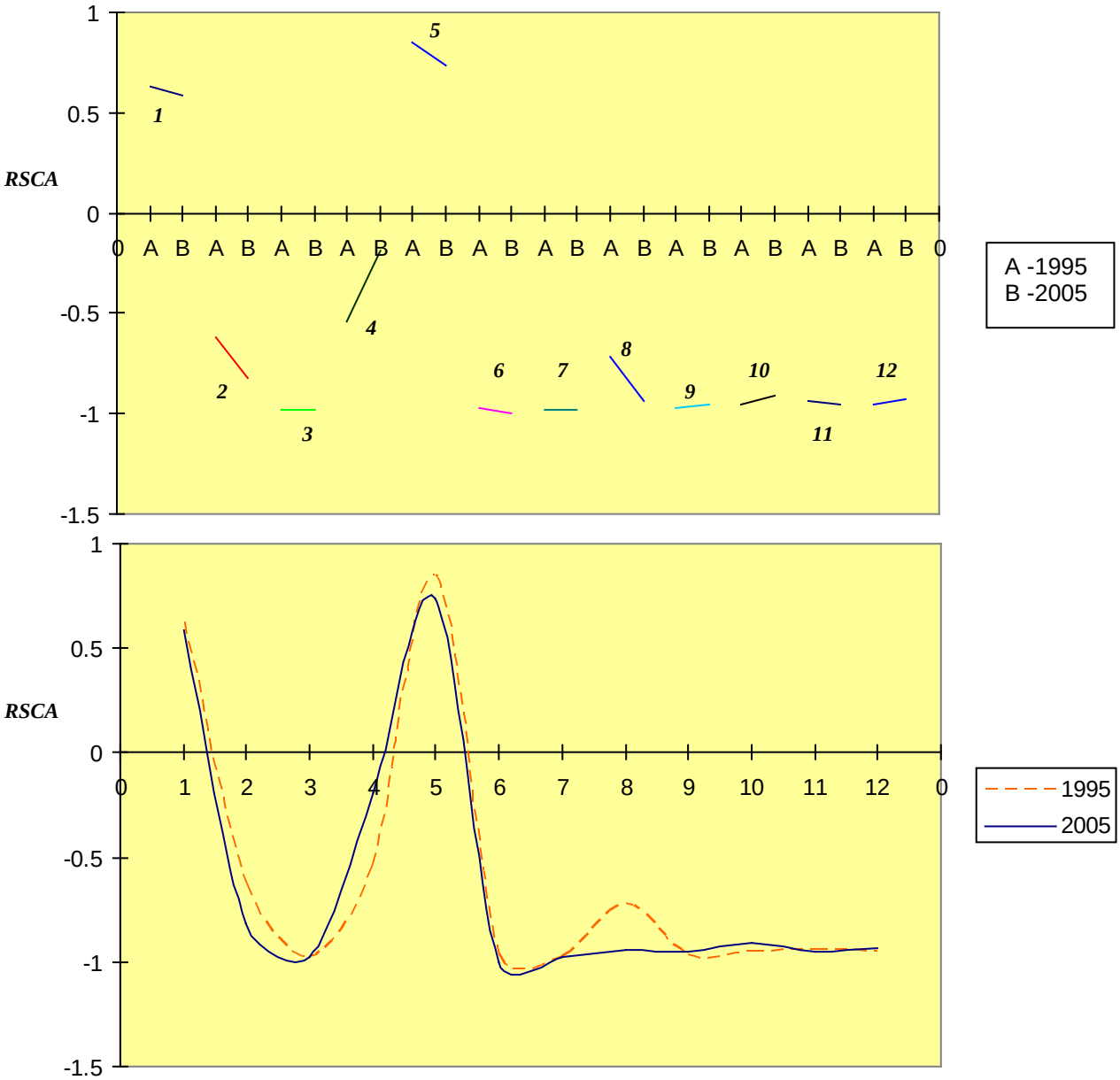


RSCA changes from 1995 to 2005 for Syria												
Product Groups	1	2	3	4	5	6	7	8	9	10	11	12
1995	0.57	0.45	0.44	0.16	0.79	-0.82	-0.95	-0.61	-0.88	-0.96	-0.25	-0.62
2005	0.56	0.40	0.25	0.39	0.67	-0.90	-0.55	-0.51	-0.76	-0.95	-0.44	-0.73

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
6. *Non-ferrous metals (SITC 68)*
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

Appendix 13: 1995-2005 RSCA analysis based on different product groups for Yemen

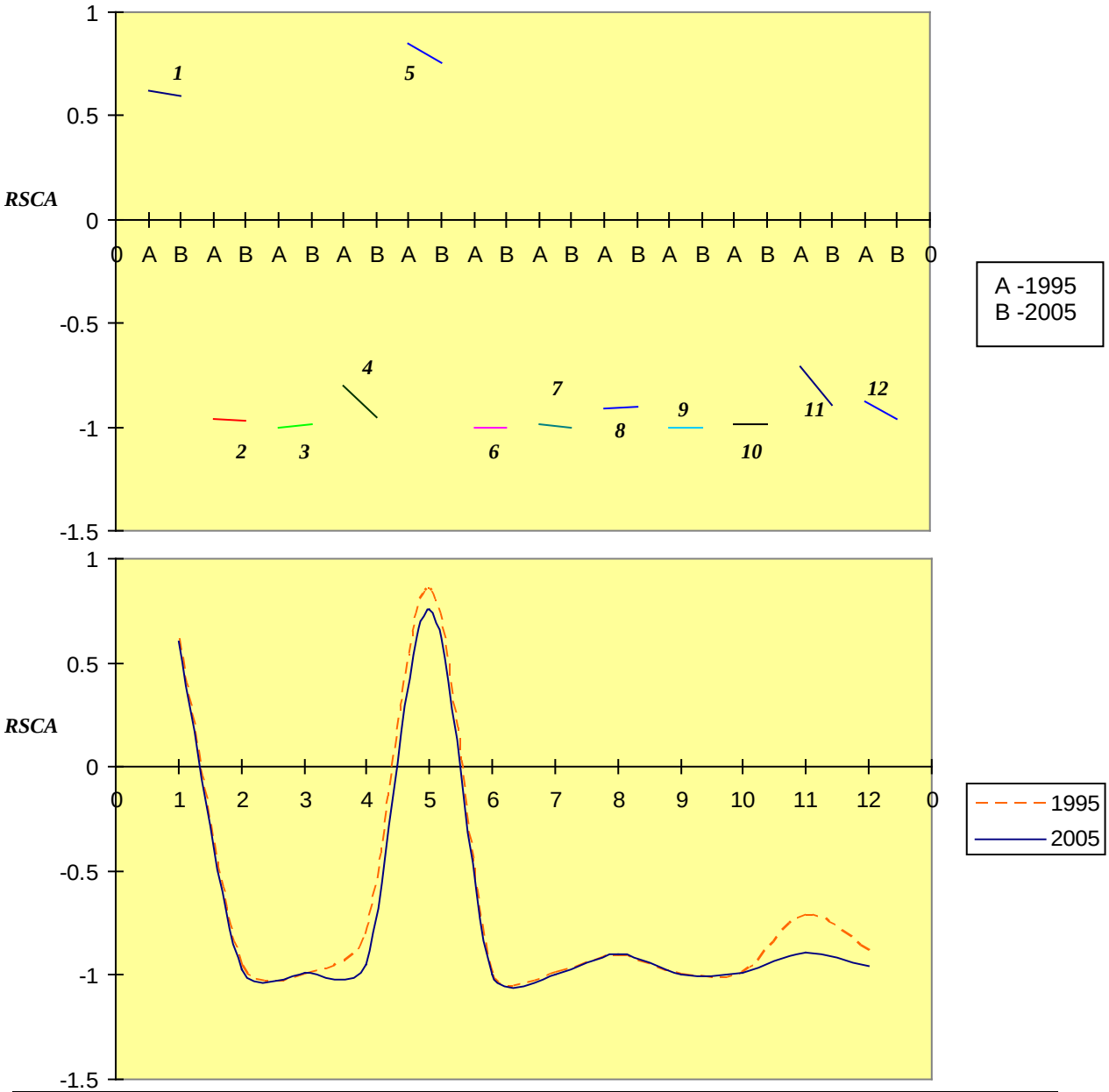


RSCA changes from 1995 to 2005 for Yemen												
Product Groups	1	2	3	4	5	6	7	8	9	10	11	12
1995	0.63	-0.62	-0.98	-0.54	0.85	-0.97	-0.98	-0.72	-0.97	-0.95	-0.94	-0.95
2005	0.59	-0.82	-0.98	-0.19	0.74	-1	-0.98	-0.94	-0.95	-0.91	-0.95	-0.93

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
6. *Non-ferrous metals (SITC 68)*
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

Appendix 14: 1995-2005 RSCA analysis based on different product groups for Angola



RSCA changes from 1995 to 2005 for Angola												
Product Groups	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1995	*0.62*	*-0.96*	*-1*	*-0.80*	*0.85*	*-1*	*-0.99*	*-0.91*	*-1*	*-0.99*	*-0.71*	*-0.88*
2005	*0.60*	*-0.97*	*-0.99*	*-0.95*	*0.76*	*-1*	*-1*	*-0.90*	*-1*	*-0.99*	*-0.89*	*-0.96*

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
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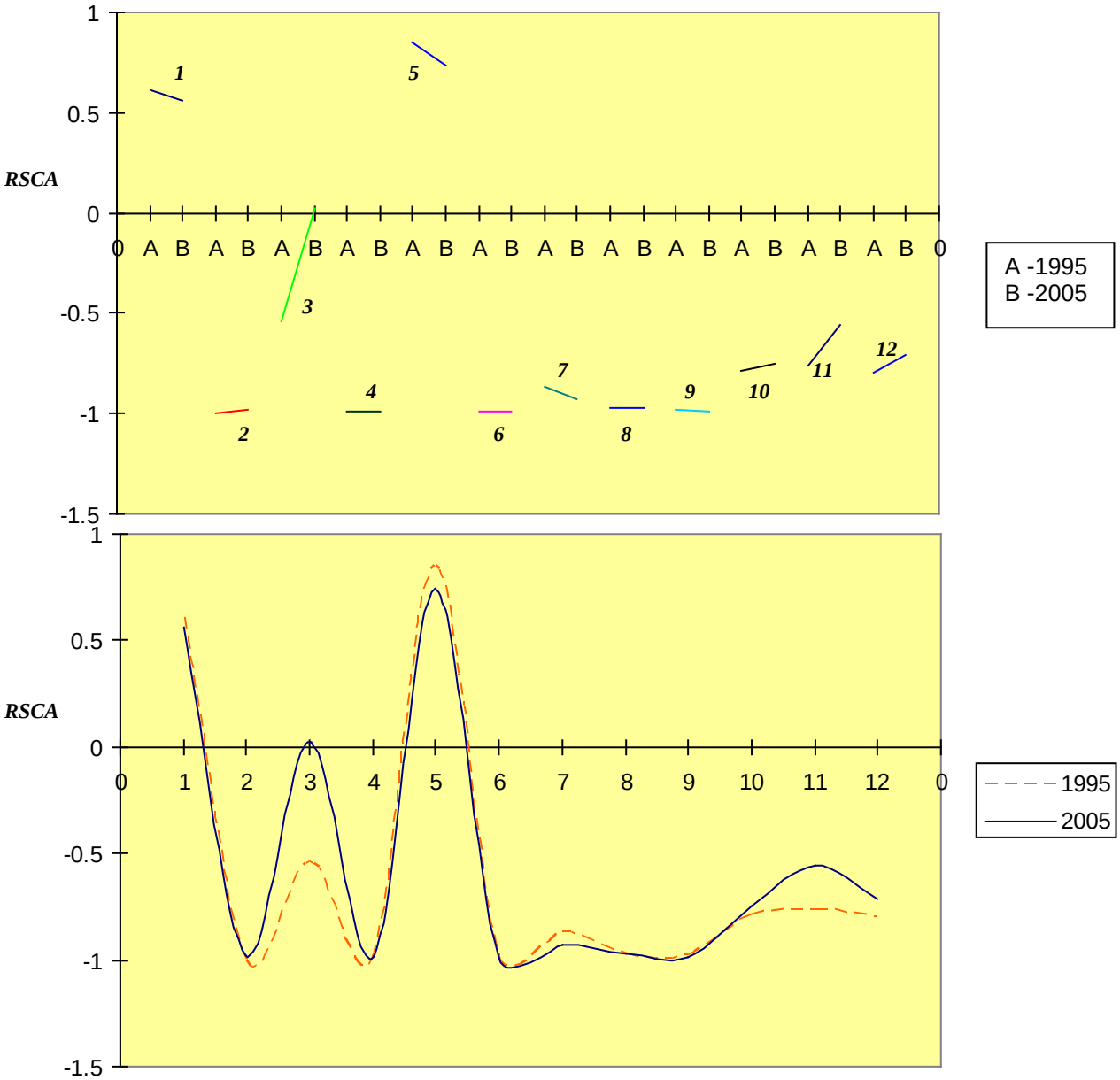
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

Appendix 14: 1995-2005 RSCA analysis based on different product groups for Brunei

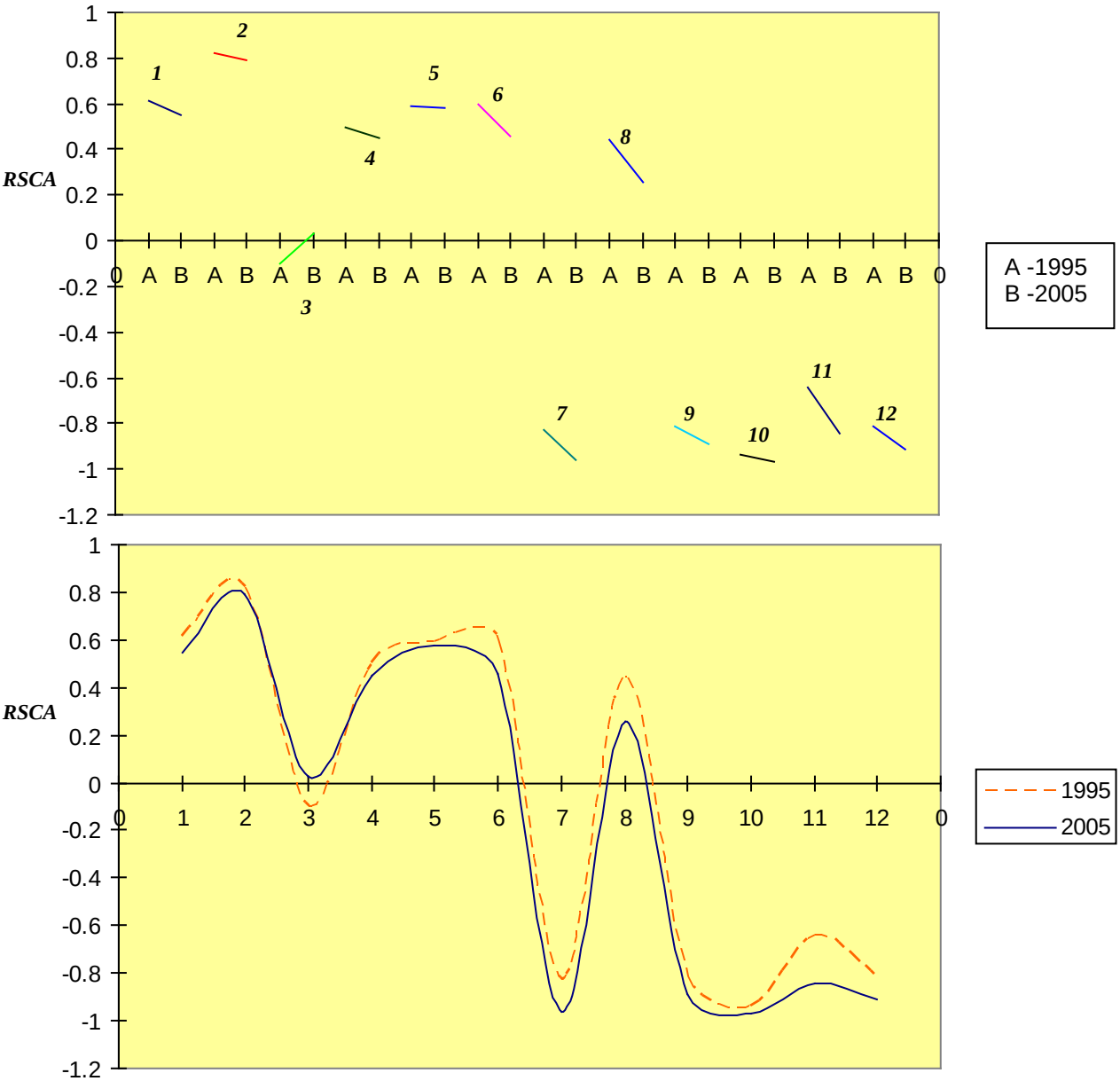


RSCA changes from 1995 to 2005 for Brunei												
Product Groups	1	2	3	4	5	6	7	8	9	10	11	12
1995	0.61	-1	-0.54	-0.99	0.85	-0.99	-0.87	-0.97	-0.98	-0.79	-0.76	-0.80
2005	0.56	-0.98	0.02	-0.99	0.74	-0.99	-0.93	-0.97	-0.99	-0.75	-0.56	-0.71

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
6. *Non-ferrous metals (SITC 68)*
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

Appendix 14: 1995-2005 RSCA analysis based on different product groups for Cameroon

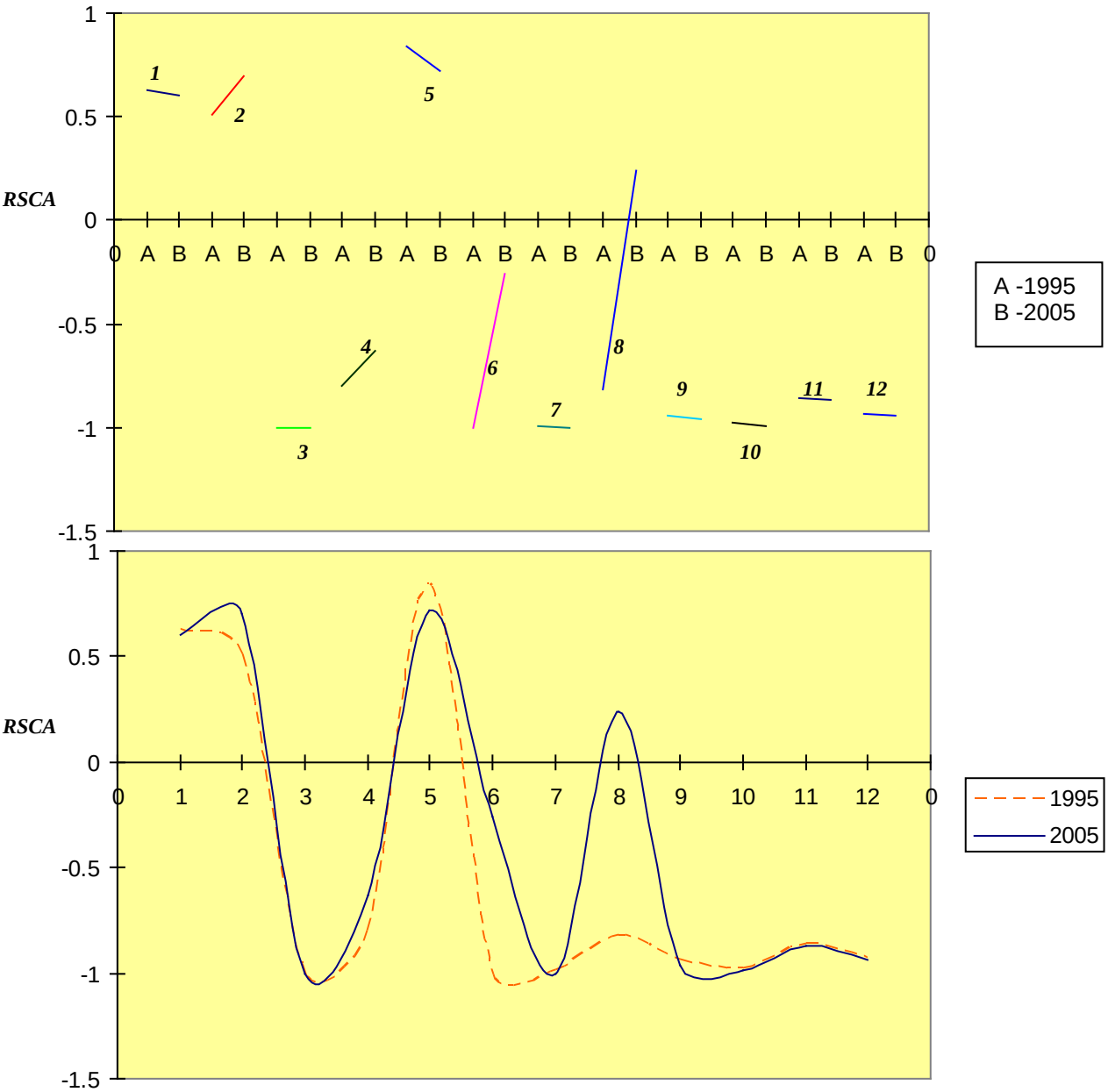


RSCA changes from 1995 to 2005 for Cameroon												
Product Groups	1	2	3	4	5	6	7	8	9	10	11	12
1995	0.61	0.82	-0.10	0.50	0.59	0.60	-0.83	0.44	-0.81	-0.94	-0.64	-0.81
2005	0.55	0.79	0.03	0.45	0.58	0.46	-0.96	0.26	-0.89	-0.97	-0.84	-0.91

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
6. *Non-ferrous metals (SITC 68)*
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

Appendix 14: 1995-2005 RSCA analysis based on different product groups for Congo

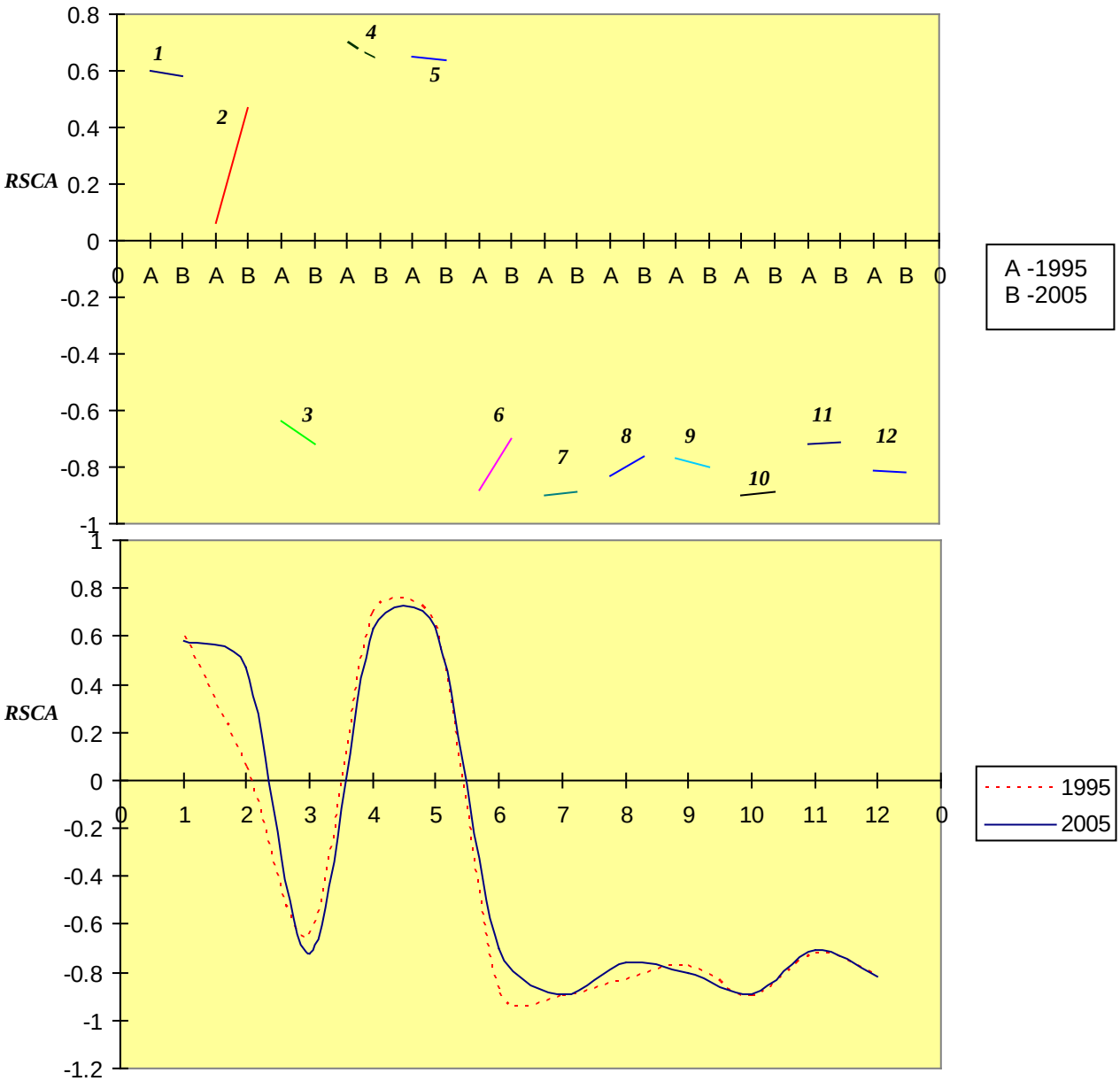


RSCA changes from 1995 to 2005 for Congo												
Product Groups	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1995	*0.63*	*0.51*	*-1*	*-0.80*	*0.84*	*-1*	*-0.99*	*-0.82*	*-0.94*	*-0.98*	*-0.86*	*-0.93*
2005	*0.60*	*0.70*	*-1*	*-0.63*	*0.72*	*-0.26*	*-1*	*0.24*	*-0.96*	*-0.99*	*-0.87*	*-0.94*

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
6. *Non-ferrous metals (SITC 68)*
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

Appendix 14: 1995-2005 RSCA analysis based on different product groups for Ecuador

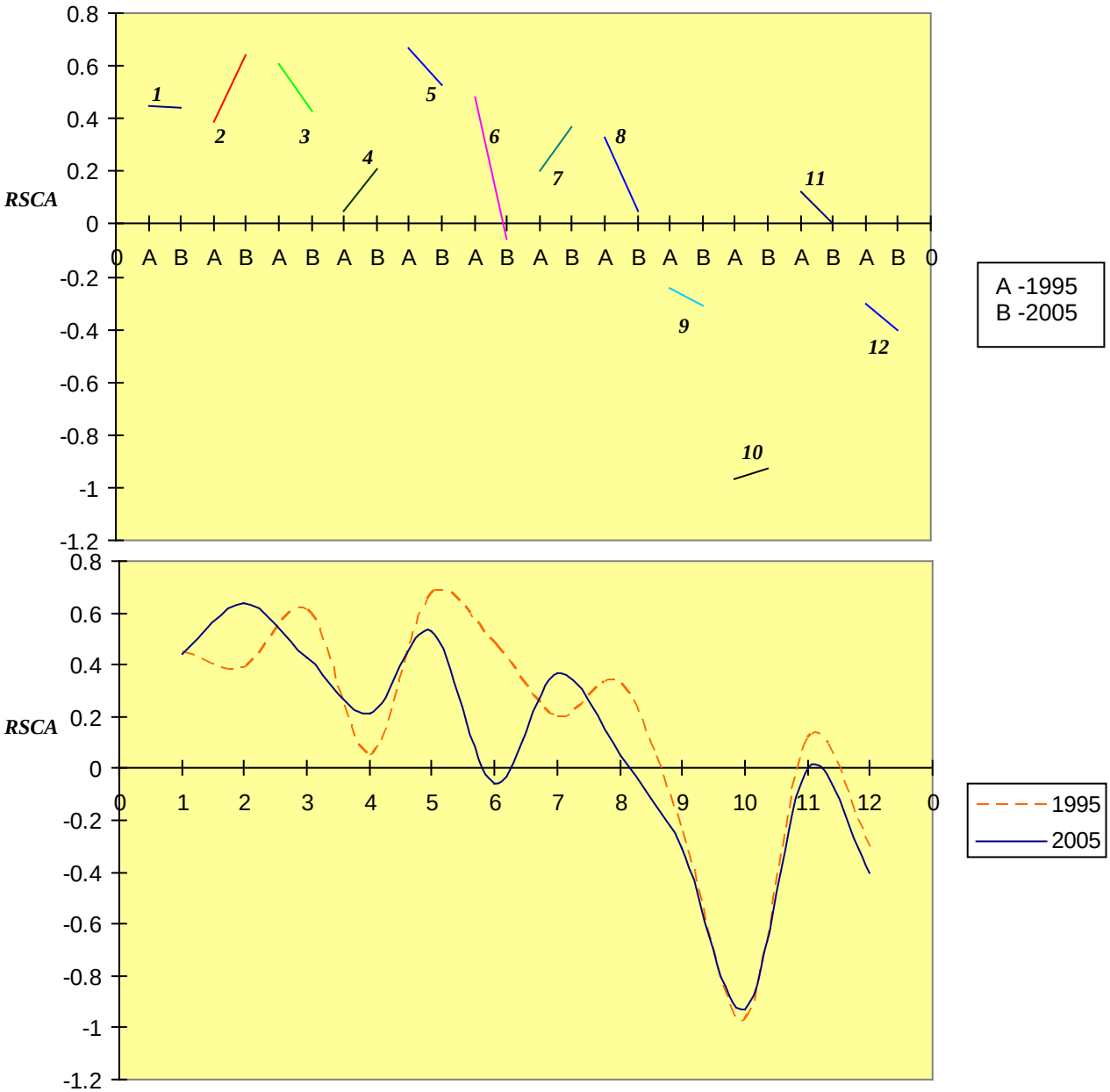


RSCA changes from 1995 to 2005 for Ecuador												
Product Groups	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1995	*0.60*	*0.06*	*-0.64*	*0.70*	*0.65*	*-0.88*	*-0.90*	*-0.83*	*-0.77*	*-0.90*	*-0.72*	*-0.81*
2005	*0.58*	*0.47*	*-0.72*	*0.63*	*0.64*	*-0.70*	*-0.89*	*-0.76*	*-0.80*	*-0.89*	*-0.71*	*-0.82*

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
6. *Non-ferrous metals (SITC 68)*
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

Appendix 14: 1995-2005 RSCA analysis based on different product groups for Egypt

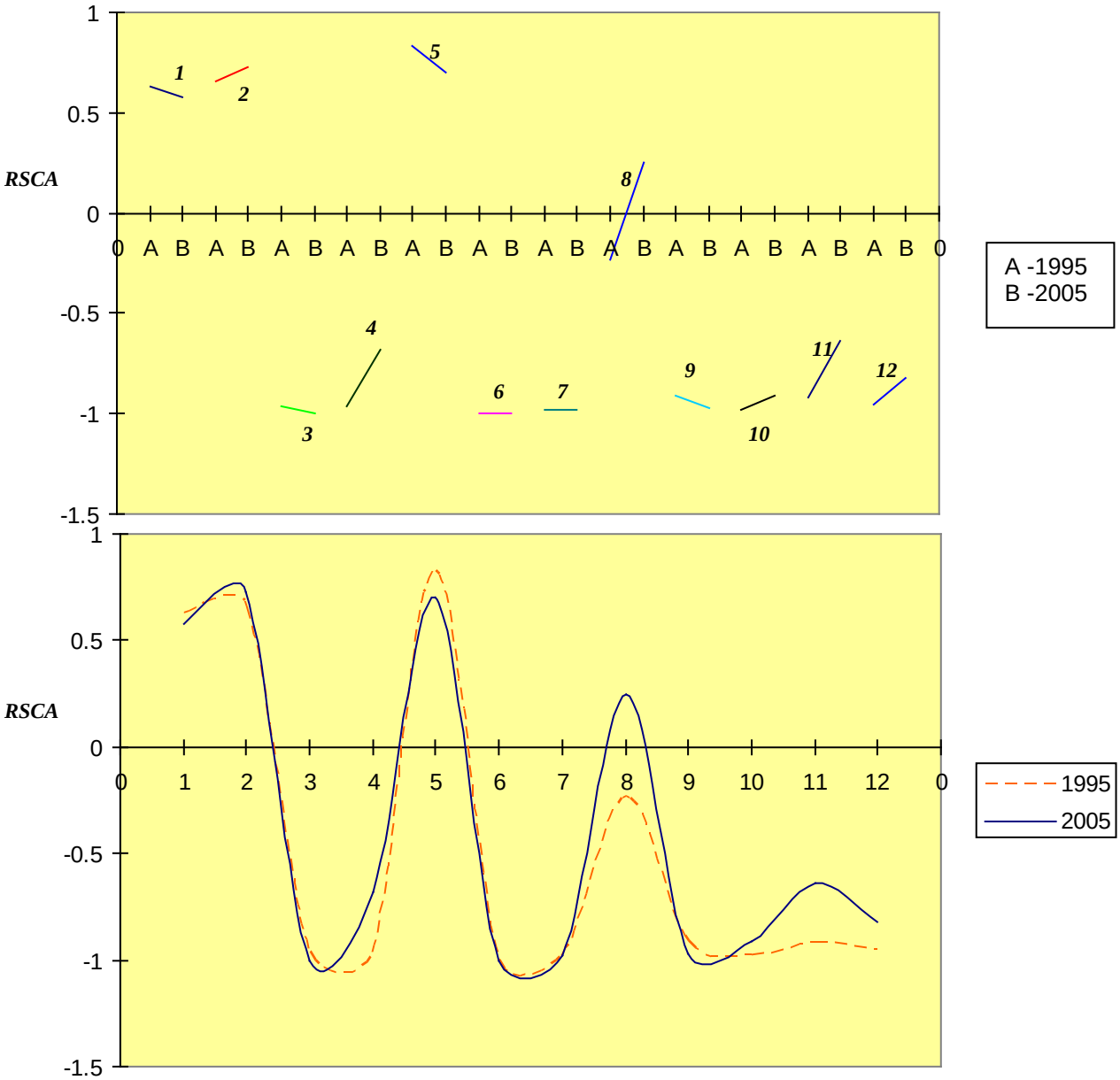


RSCA changes from 1995 to 2005 for Egypt												
Product Groups	1	2	3	4	5	6	7	8	9	10	11	12
1995	0.45	0.39	0.61	0.05	0.67	0.48	0.20	0.33	-0.24	-0.97	0.12	-0.30
2005	0.44	0.64	0.43	0.21	0.53	-0.06	0.37	0.05	-0.31	-0.93	0	-0.40

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
6. *Non-ferrous metals (SITC 68)*
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

Appendix 14: 1995-2005 RSCA analysis based on different product groups for Gabon

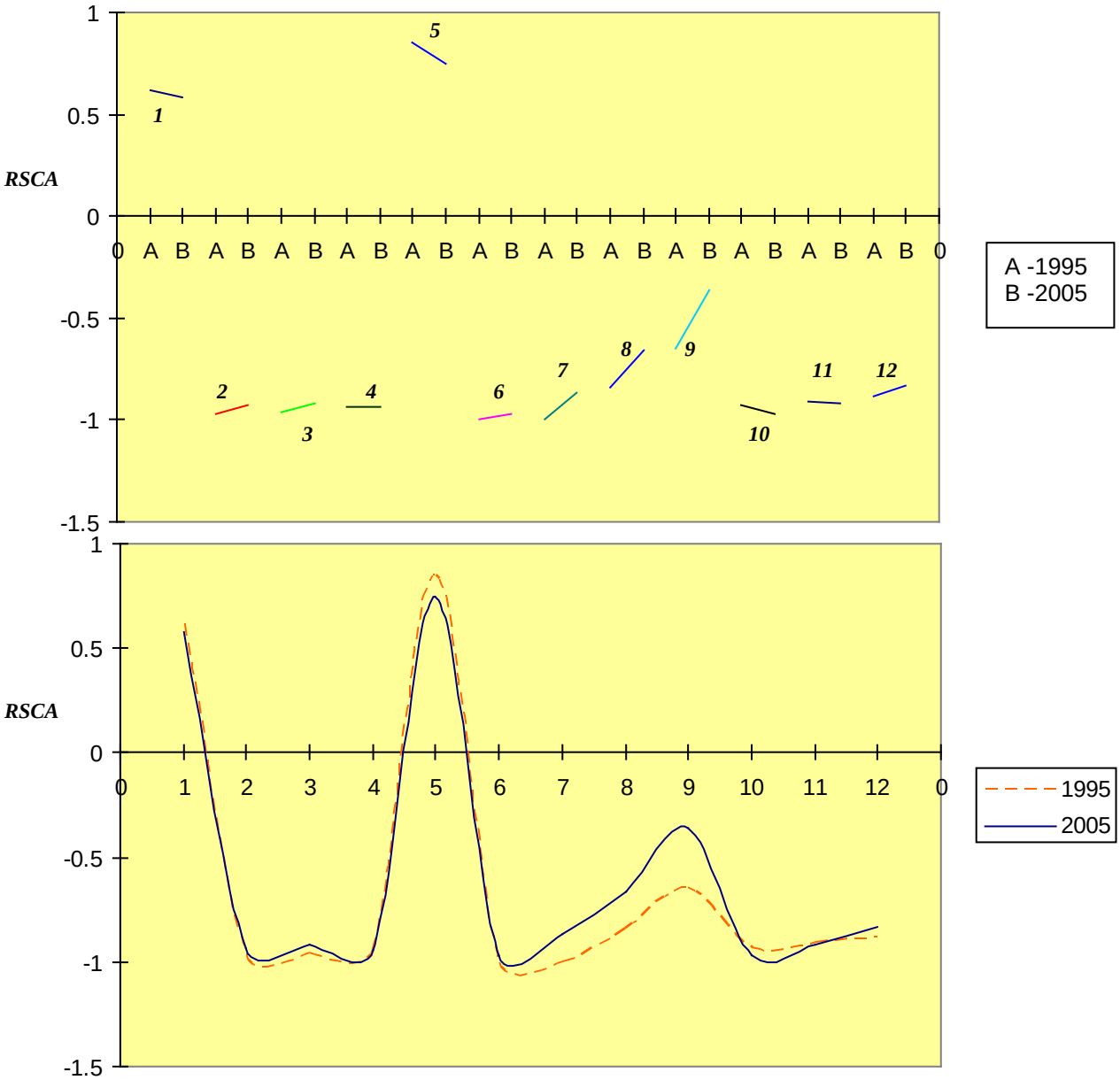


RSCA changes from 1995 to 2005 for Gabon												
Product Groups	1	2	3	4	5	6	7	8	9	10	11	12
1995	0.63	0.66	-0.96	-0.96	0.83	-1	-0.98	-0.23	-0.91	-0.98	-0.92	-0.95
2005	0.58	0.73	-1	-0.68	0.70	-1	-0.98	0.25	-0.97	-0.91	-0.64	-0.82

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
6. *Non-ferrous metals (SITC 68)*
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

Appendix 14: 1995-2005 RSCA analysis based on different product groups for Kuwait

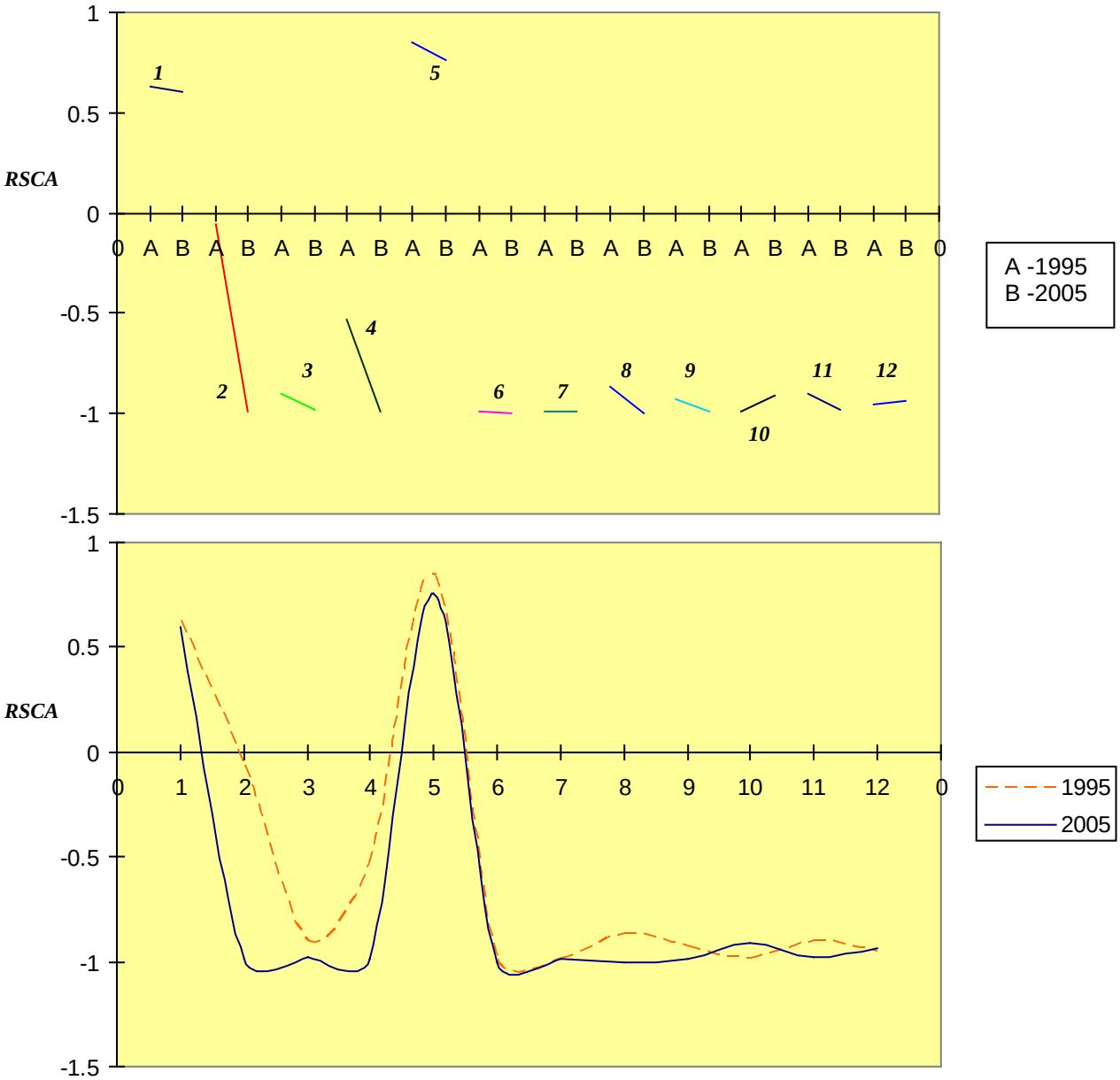


RSCA changes from 1995 to 2005 for Kuwait												
Product Groups	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1995	*0.62*	*-0.97*	*-0.96*	*-0.94*	*0.85*	*-1*	*-1*	*-0.84*	*-0.65*	*-0.93*	*-0.91*	*-0.88*
2005	*0.58*	*-0.93*	*-0.92*	*-0.94*	*0.75*	*-0.97*	*-0.87*	*-0.66*	*-0.36*	*-0.97*	*-0.92*	*-0.83*

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
6. *Non-ferrous metals (SITC 68)*
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

Appendix 14: 1995-2005 RSCA analysis based on different product groups for Nigeria

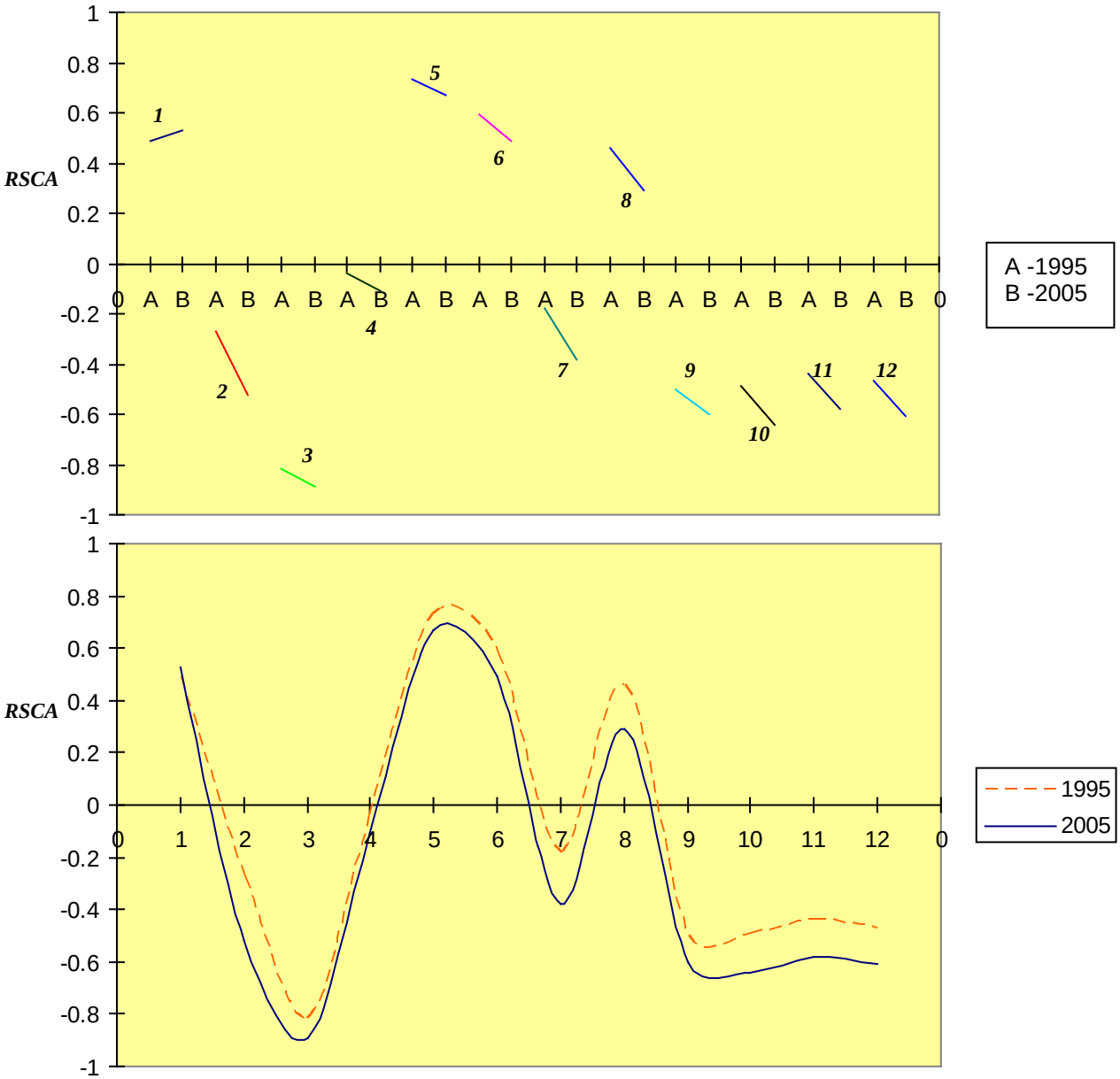


RSCA changes from 1995 to 2005 for Nigeria												
Product Groups	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1995	*0.63*	*-0.06*	*-0.90*	*-0.53*	*0.85*	*-0.99*	*-0.99*	*-0.87*	*-0.93*	*-0.99*	*-0.90*	*-0.95*
2005	*0.60*	*-0.99*	*-0.98*	*-0.99*	*0.76*	*-1*	*-0.99*	*-1*	*-0.99*	*-0.91*	*-0.98*	*-0.94*

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
6. *Non-ferrous metals (SITC 68)*
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

Appendix 14: 1995-2005 RSCA analysis based on different product groups for Norway

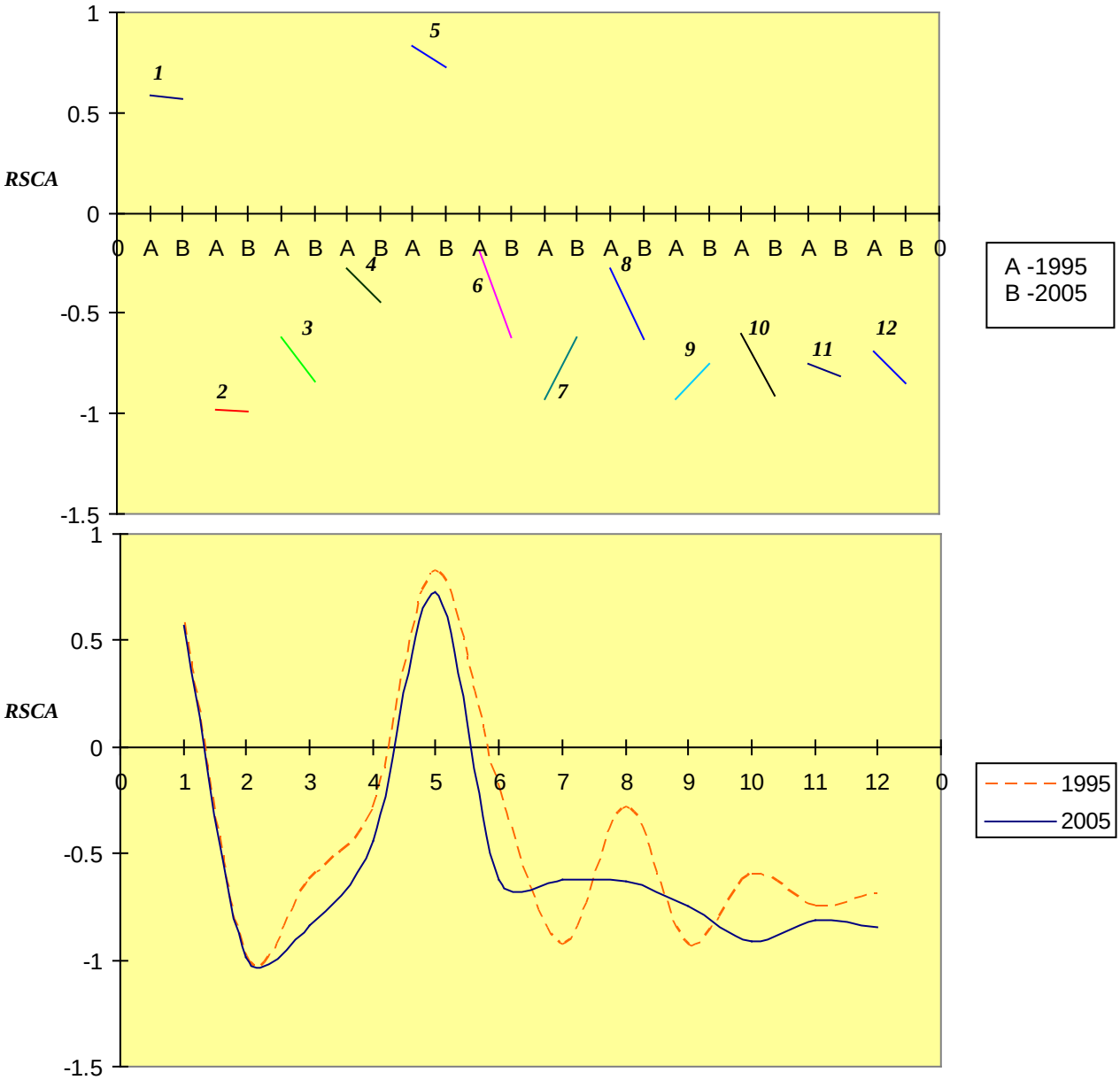


RSCA changes from 1995 to 2005 for Norway												
Product Groups	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1995	*0.49*	*-0.27*	*-0.82*	*-0.04*	*0.73*	*0.59*	*-0.18*	*0.46*	*-0.50*	*-0.49*	*-0.44*	*-0.47*
2005	*0.53*	*-0.52*	*-0.89*	*-0.11*	*0.67*	*0.49*	*-0.38*	*0.29*	*-0.60*	*-0.64*	*-0.58*	*-0.61*

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
6. *Non-ferrous metals (SITC 68)*
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

Appendix 14: 1995-2005 RSCA analysis based on different product groups for Oman

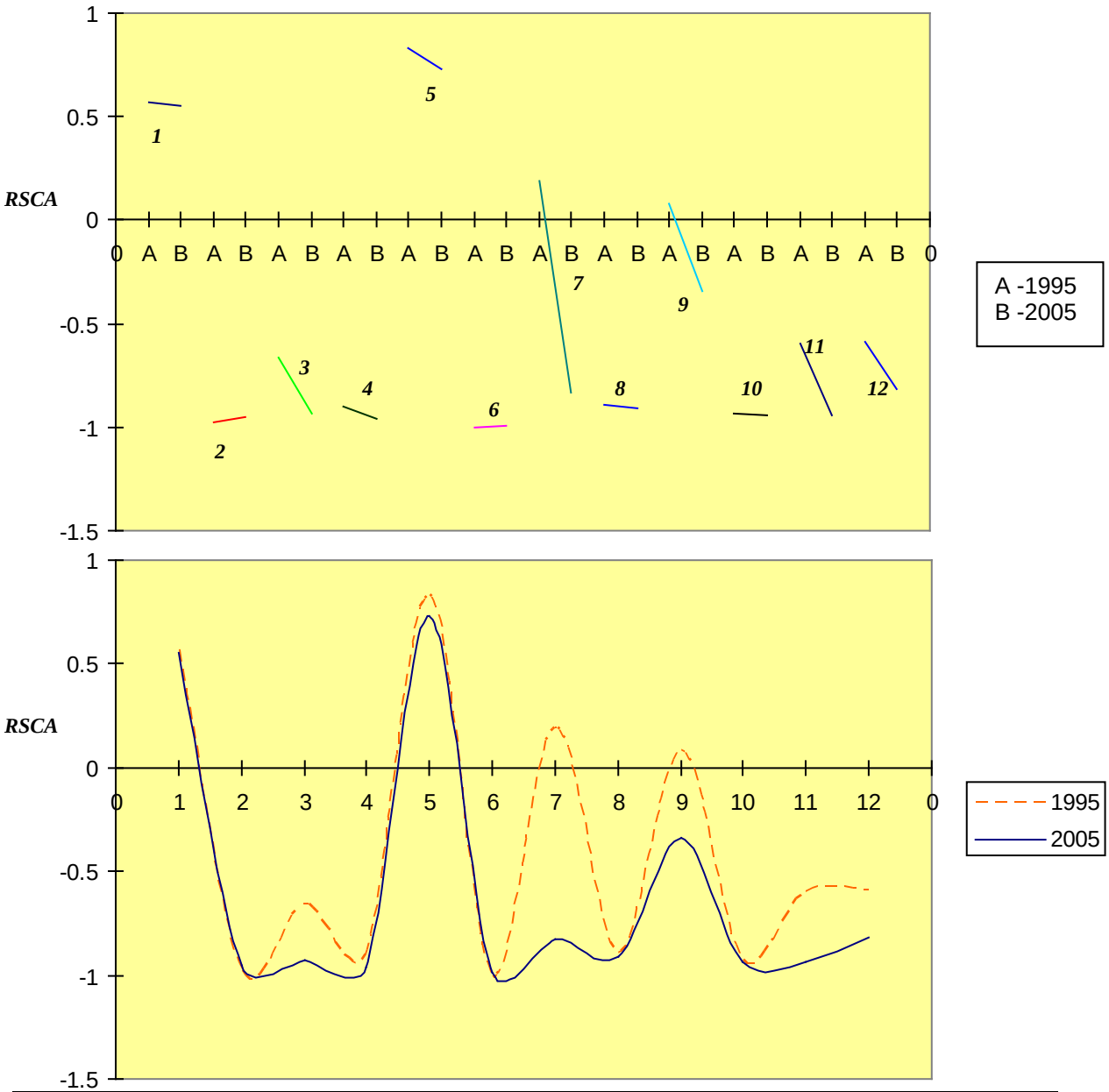


RSCA changes from 1995 to 2005 for Oman												
Product Groups	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1995	*0.59*	*-0.98*	*-0.62*	*-0.28*	*0.83*	*-0.19*	*-0.93*	*-0.28*	*-0.93*	*-0.60*	*-0.75*	*-0.69*
2005	*0.57*	*-0.99*	*-0.84*	*-0.44*	*0.73*	*-0.62*	*-0.62*	*-0.63*	*-0.75*	*-0.91*	*-0.81*	*-0.85*

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
6. *Non-ferrous metals (SITC 68)*
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

Appendix 14: 1995-2005 RSCA analysis based on different product groups for Qatar

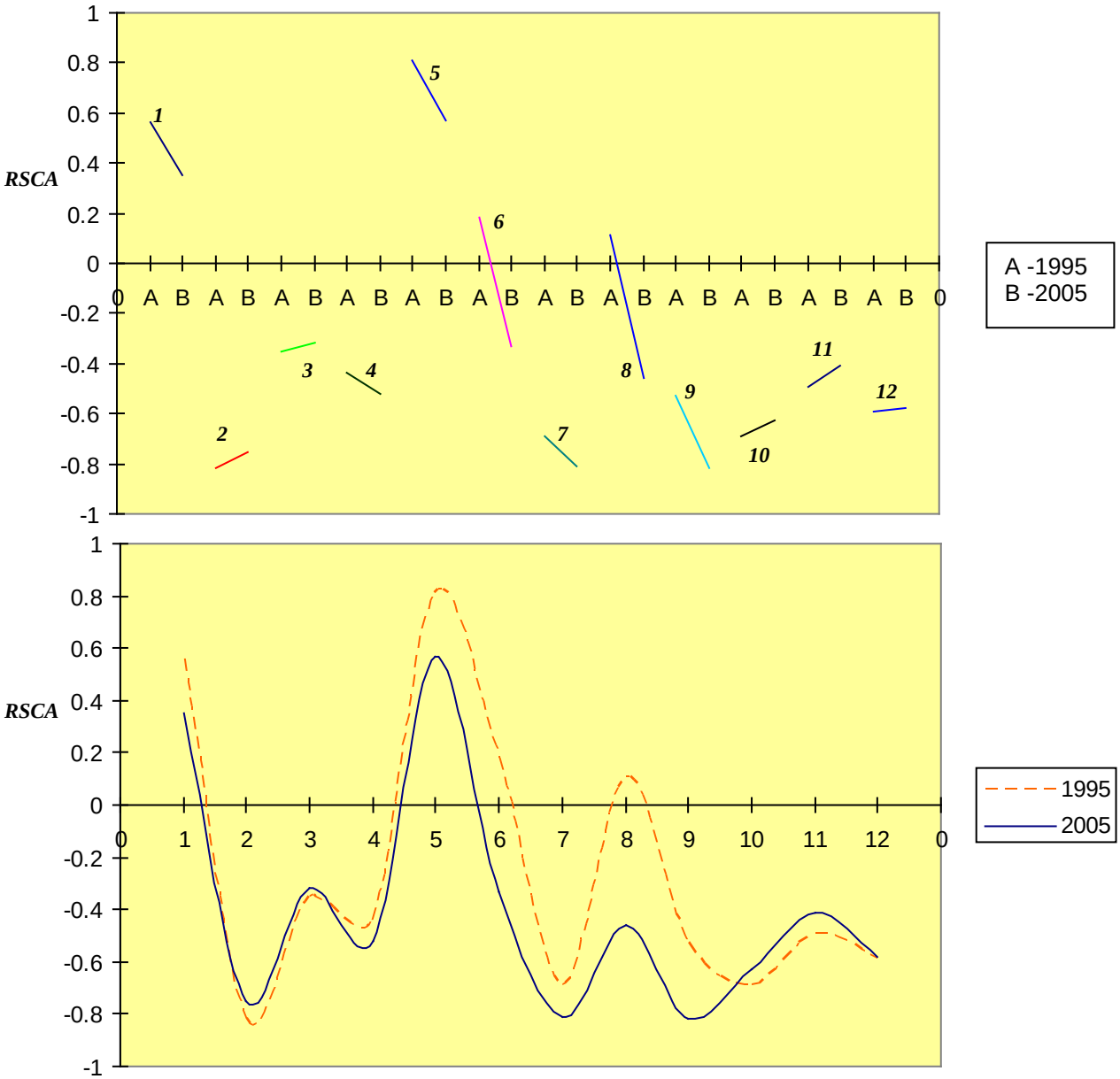


RSCA changes from 1995 to 2005 for Qatar												
Product Groups	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1995	*0.57*	*-0.98*	*-0.66*	*-0.90*	*0.83*	*-1*	*0.19*	*-0.89*	*0.08*	*-0.93*	*-0.60*	*-0.59*
2005	*0.55*	*-0.95*	*-0.93*	*-0.96*	*0.73*	*-0.99*	*-0.83*	*-0.91*	*-0.34*	*-0.94*	*-0.94*	*-0.82*

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
6. *Non-ferrous metals (SITC 68)*
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

Appendix 14: 1995-2005 RSCA analysis based on different product groups for UAE

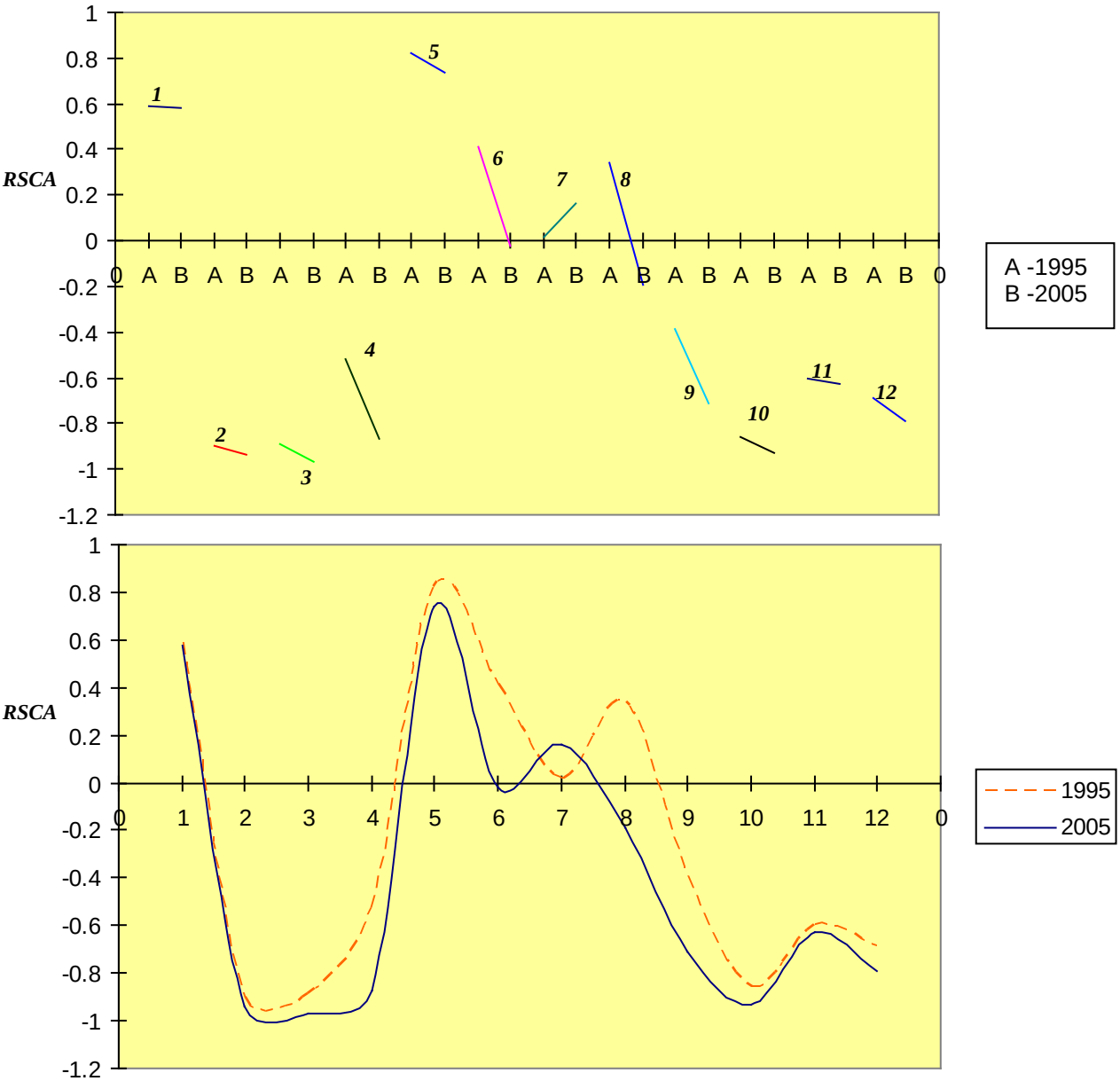


RSCA changes from 1995 to 2005 for UAE												
Product Groups	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1995	*0.56*	*-0.82*	*-0.35*	*-0.44*	*0.81*	*0.18*	*-0.69*	*0.11*	*-0.53*	*-0.69*	*-0.49*	*-0.59*
2005	*0.35*	*-0.75*	*-0.32*	*-0.52*	*0.57*	*-0.33*	*-0.81*	*-0.46*	*-0.82*	*-0.63*	*-0.41*	*-0.58*

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
6. *Non-ferrous metals (SITC 68)*
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

Appendix 14: 1995-2005 RSCA analysis based on different product groups for Venezuela



RSCA changes from 1995 to 2005 for Venezuela												
Product Groups	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1995	*0.59*	*-0.90*	*-0.89*	*-0.52*	*0.82*	*0.41*	*0.02*	*0.34*	*-0.39*	*-0.86*	*-0.60*	*-0.69*
2005	*0.58*	*-0.94*	*-0.97*	*-0.87*	*0.74*	*-0.02*	*0.16*	*-0.19*	*-0.71*	*-0.93*	*-0.63*	*-0.79*

Source: Authors calculations based on UNCTAD online Handbook of Statistics 2006

1. *Primary commodities, including fuels (SITC 0,1,2,3,4,68)*
2. *Agricultural raw materials (SITC 2,22,27,28)*
3. *Textile fibres, yarn, fabrics and clothing (SITC 26,65,84)*
4. *All food items (SITC 0,1,22,4)*
5. *Fuels (SITC 3)*
6. *Non-ferrous metals (SITC 68)*
7. *Iron and steel (SITC 67)*
8. *Ores and metal (SITC 27,28,68)*
9. *Chemical products (SITC 5)*
10. *Machinery and transport equipment (SITC 7)*
11. *Other Manufactured goods (SITC 6,8 less 68)*
12. *Manufactured goods (SITC 5 to 8 less 68)*

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